PB86-110046

Environmental Management Report Update Region 10, 1985

(U.S.) Environmental Protection Agency
Seattle, WA

Sep 85

U.S. Department of Commerce
National Technical Information Service
NTIS

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA 910/9-85-130	2.	3. Recipient's Accession No. PB86 110046/AS
4. Title and Subtitle: Environmental Management Report Update Region 10, 1985.			5. Report Date: September 1985 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: U.S. Environmental Protection Agency Region 10 1200 6th Avenue Seattle, WA 98101			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 1985 update to the Region 10 Environmental Management Report of 1983 describes work planned during Fiscal 86 in high priority efforts by the States of the Pacific Northwest and Region 10 to address current and emerging environmental problems. Because those problems we now feel merit priority status are not the same problems we discussed in 1983 and 1984, the organization of this 1985 update differs. Where possible, environmental problems were discussed collectively by media. For example, the general topic of Pesticides and Toxic Substances, identified as a separate priority problem in 1983, is addressed this year in media-related sections on Groundwater and Air Contamination. Similarly, Fishery Damage is discussed this year as part of the placer mining and nonpoint source problem discussions. We also took a different approach to ranking the significance of each problem this year. Our Management Team assessed each environmental problem independently according to four criteria: (1) number of persons exposed, (2) human health risk, (3) ecological risk, and (4) the level of public concern. They were also asked to weigh each of the four criteria. The attached environmental priority list presents the results of this exercise. Our top priority -- hazardous waste contamination of groundwater.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms

Puget Sound, Washington
Pacific Northwest

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages 66
	20. Security Class (This Page)	22. Price 11.95

(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

REGION 10

ENVIRONMENTAL MANAGEMENT REPORT UPDATE

SEPTEMBER, 1985

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Part I. Regional Administrator's Overview

The 1985 update to the Region 10 Environmental Management Report of 1983 describes work planned during Fiscal 86 in high priority efforts by the States of the Pacific Northwest and Region 10 to address current and emerging environmental problems. Because those problems we now feel merit priority status are not the same problems we discussed in 1983 and 1984, the organization of this 1985 Update differs.

Where possible, environmental problems were discussed collectively by media. For example, the general topic of Pesticides and Toxic Substances, identified as a separate priority problem in 1983, is addressed this year in media-related sections on Groundwater and Air Contamination. Similarly, Fishery Damage is discussed this year as part of the placer mining and nonpoint source problem discussions.

We also took a different approach to ranking the significance of each problem this year. Our Management Team assessed each environmental problem independently according to four criteria: (1) number of persons exposed, (2) human health risk, (3) ecological risk, and (4) the level of public concern. They were also asked to weigh each of the four criteria. The attached environmental priority list presents the results of this exercise. Our top priority -- hazardous waste contamination of groundwater.

Region 10 program staff devoted extra effort this year to identify potential environmental indicators for each problem and to analyze two geographical focus areas -- Puget Sound and Silver Valley, Idaho.

1983 Environmental Priorities not appearing in this 1985 Update:

Lead - Due to the depressed world market for copper, the ASARCO smelter in Tacoma closed. Our concern for lead pollution is now much more localized as in Silver Valley, Idaho. Even there, the closure of the Bunker Hill Smelter has drastically reduced ambient lead concentrations.

Ozone - State Implementation Plan redesignations of ozone nonattainment areas to attainment were submitted for Medford, Oregon and Seattle-Tacoma, Washington. The Portland-Vancouver area exceeded ambient standards only twice during the summer of 1985 due to meteorological conditions. Generally, ambient ozone standards are rarely exceeded.

TSP - Air quality improvements resulting from diminishing ambient concentrations of TSP are due, in large part, to the implementation of effective control strategies. EPA approved a joint request to redesignate the Lewiston-Clarkston interstate nonattainment area to attainment for primary TSP standards this year. New woodstove legislation was approved and incorporated within the Oregon State Implementation Plan (SIP) this year also.

Activities in 1985

Fiscal 1985 brought limited improvement in compliance with hazardous waste requirements affecting groundwater. Some businesses that now manage on-site the hazardous wastes they generate are electing to close their waste

management activities rather than upgrade to meet stringent technical operating requirements. We hope to issue final permits under the Resource Conservation and Recovery Act for seven operating sites next year. Surface clean-up was completed at the Western Processing Superfund site in Kent, Washington this year.

Region 10 participated in Agency efforts to determine the extent and significance of groundwater contamination from agricultural pesticides and leaking underground storage tanks. Protective state or local programs seem unlikely to develop until EPA inventories are in. Private-sector and EPA laboratory resources are generally inadequate to respond to public concerns about pesticides in groundwater.

Water pollution by nonpoint source continues to be a stubborn and frustrating problem. About 60 percent of the Region's water pollution problem stems from nonpoint sources. Nonpoint source pollution is largely responsible for the closing of shellfish beds in the commercially important southern region of Puget Sound. We know how to solve these problems, but lack regulatory and funding authority to do so. Control of nonpoint pollution from federal lands could be achieved through EPA arrangements with the custodial agencies. Each state in Region 10 has projects or activities partly supported with federal funds to address agricultural or silvicultural pollution. The effectiveness of these projects varies. Alaska, Idaho and Washington plan to further stiffen the water quality sections of their silviculture control programs next year. Management plans to control nonpoint source pollution in Tillamook and Coos Bays, Oregon have resulted in the reclassification of some closed shellfish beds to conditional status.

Wetlands protection activities in Region 10 resulted in the development of a policy to require mitigative measures to offset losses of wetlands functions and values, and a priority list to alert developers and others planning development projects that important sites might be affected. The Regional Office elevated two wetlands permit cases for reviews by EPA and the Army Corps of Engineers Headquarters this year. Region 10 also plans to work next year to raise public awareness and concern about wetlands.

Information gathered by states and local agencies in the Northwest suggests that wood-treatment and chemical facilities are potential major sources of toxic air pollutants. Other sources include motor vehicles, petroleum distribution, residential woodstoves and agricultural burning. By the end of 1987, a draft Regional air toxics strategy prepared this year is expected to lead to the development of a database and state and local control programs. We are optimistic that state programs will include contingency plans to protect public health in the event of emergency releases of toxicants. Headquarters funding and guidance is needed to facilitate development of toxicant control programs.

State systems to monitor respirable particulates will be established and operational by January 1986. Development of a control program, however, still awaits promulgation of EPA standards and guidelines. Particulate monitoring so far indicates problems in suburban areas, rural communities, topographically confined locales, and areas where integral vistas are affected. Oregon requires certification of woodburning stoves. Other Region 10 states also seek to stabilize these emissions and are considering strategies similar to Oregon's.

Public concern about inhalable particles led to vigorous prohibition of woodburning when pollution is excessive in the Mendenhall Valley of Juneau, Alaska, and the development of an air quality management plan for a rural valley in Washington targeted for a ski development. The Region is undertaking studies to characterize the health effects of slash and field burning.

Consent decrees ready for signature by nearly 550 placer miners in Alaska are expected next year to result in relatively rapid reduction of turbidity in about 4,100 miles of streams designated for fish habitat and drinking water supply.

A Momorandum of Agreement signed this year by the Puget Sound Water Quality Authority, the Washington Department of Ecology and EPA established the mutual responsibility of these agencies to: (1) delineate complementary roles, (2) coordinate their management programs, and (3) jointly implement the Puget Sound Estuarine Program. Studies continue to develop the Sound's loading model and to clean-up chemically contaminated embayments.

Significant environmental progress in the past year occurred due to the cooperative efforts of NEIC and EPA criminal investigators. Through vigorous federal-state compliance and enforcement actions, evidence of illegal dumping by one Duwamish River wood-treatment company in Seattle was obtained and resulted in a fine of $1 million against the company and a jail term of 60 days for the company president. Part of the fine ($850,000) is to be spent for Puget Sound pollution control work designated by the Regional Administrator through an environmental trust fund. This trust fund represents a creative solution to the need to make the criminal justice system dovetail with environmental protection.

Some additional highlights:

At our mid-year management retreat, we heard predictions from Northwest experts on the economic future of the industries we regulate and then contemplated what impact such changes might have on the way Region 10 does business. As background research for the meeting, our economist, Bob Coughlin, prepared a study of Region 10 economic trends. That study has been widely distributed throughout the business and government communities and was cited by an area newspaper for its fresh insights.

Because our ADP staff have demonstrated their proficiency through projects like the development of telecommunication and minicomputer system software for the Agency, Region 10 has been selected to receive a new minicomputer. This equipment will greatly enhance our ability to store, manipulate and transfer data and assist current efforts to: (1) develop an enforcement caseload system, (2) store Western Lakes Survey data, and expedite lab research utilization and automation.

Ernesta B. Barnes
Region 10 Administrator

For those readers not familiar with the Pacific Northwest, a summary of the findings from the Region 10 Economic Trend Study are provided below as an introduction. Those who desire more information may contact our Seattle office for a copy of the study.

1. Historically, population growth of Region 10 states has occurred at rates greater than the nation. In the last decade the region's population increased at twice the national rate.

2. High relative personal income in Region 10 has stemmed in large measure from industrialization, based on natural resources and skilled labor. Forest products, agriculture, and hydroelectricity have been the central elements of the economy, with transportation equipment and nuclear engineering secondary sources of income advantage.

3. Average income in all Region 10 states but Washington has been falling since the mid-seventies. Per capita personal income in both Oregon and Idaho is now distinctly below the national norm.

4. Nationally, goods-related industries are producing a progressively smaller share of personal income, while dividends, interest, rent and transfers provide a progressively larger share. Prices of raw materials have been falling relative to interest rates and finished product prices. The trends have been disadvantageous to regions with economies based on raw materials and manufacturing.

5. a) Alaska has been enjoying a continuing boom as a consequence of expanded petroleum production. Service industries have been stimulated by petroleum revenues. Conversely, established forest products and fishery industries have declined as a consequence of resource and exchange constraints.

b) Idaho's economy has contracted severely in the last five years as a consequence of its dependence on agriculture and forest products. Secondary service industries have suffered, though there has been some strength in miscellaneous manufacturing. The State has become dependent on transfers for roughly three-tenths of its personal income.

c) Oregon has suffered a four year recession in which all of its basic industries--but particularly lumbering, construction, and wholesale and retail trade--have contracted. Weakness has extended to secondary service industries; and only secondary manufacturing industries show any sign of relative strength. Gross personal income as well as per capita income has been dropping.

d) Washington's economy, bolstered by military spending, service to Alaska and atypically strong agriculture, has been the firmest among Region 10 states since 1972 despite the absolute weakness of its forest products industries and relative weakness in both trade and secondary services.

6. The region as a whole has been increasing its economic dependence on manufacturing and agriculture, the softest elements of the national economy. Alaska's economy has become dominated by petroleum. Significant elements in the Region's economic future will be the rate of depletion of Alaskan petroleum reserves, loss of the competitive advantage previously conferred by hydroelectricity, constraints on forest products imposed by the reforestation rate, and expansion of Pacific basin trade.

Region 10

1985 EMR Update

Environmental Priority List

1. Hazardous Waste Contamination of Groundwater
2. Puget Sound
3. Air Toxics
4. PCB Strategy for Utility and Scrap/Salvage Operations
5. Bacterial/Toxic Contamination of Shellfish
6. Pesticide Contamination of Groundwater
7. Leaking Underground Storage Tanks
8. Wetlands Protection
9. Nonpoint Source Contamination of Surface Water
10. Silver Valley/Coeur d'Alene, Idaho
11. Carbon Monoxide
12. Acid Deposition
13. Respirable Particulates
14. Placer Mining

Part II. Regional Environmental Problems

GROUNDWATER CONTAMINATION

Problem Assessment

Groundwater contamination in the Northwest is on the increase and stems from many sources. This year, Region 10 judged that waste-disposal practices, leaking underground storage tanks and the use of agricultural chemicals constitute the most significant aspects of groundwater contamination problems in need of our attention here. Contaminants from these sources include chlorinated solvents, pesticides, other hydrocarbons (gasoline), metals, nitrates and microorganisms.

Most aquifers in the Northwest are relatively shallow, easy to tap and produce large volumes of high quality water. These same characteristics also make groundwater resources easily susceptible to contamination by land surface activities and waste disposal. The extent of the threat to public health and the environment is better understood when one considers that over 50 percent of the population in Region 10 receives their drinking water from groundwater sources. In the state of Washington alone, over 95 percent of the 10,000 public water systems use groundwater resources.

Superfund:

Past practices for the disposal of toxic and hazardous wastes have caused actual or potential contamination of groundwater. Nationally, over 80 percent of the sites on the Superfund National Priorities List (NPL) rank high in actual or potential threats to groundwater. In Region 10, the list of potential groundwater contamination sites stands at 914 and includes 32 sites on or proposed for the NPL (Idaho -4; Oregon -5; and Washington -23). Emergency cleanups were completed at three sites during 1985 to stabilize them until long-term remedial work is completed.

While a limited, emergency cleanup can be conducted at any site where the public health is threatened, the more expensive, long-term cleanup actions, such as those under Superfund, must be based on thorough research and site evaluation. Ground-water protection research is being conducted under the Resource Conservation and Recovery Act (RCRA) for operating hazardous waste disposal sites; however, it is extremely complex. Tracing contamination after it is found is only slightly easier.

RCRA:

Presently in Region 10, there are at least twenty-five industrial facilities -- electroplaters, wood-treatment plants, refineries, and large waste-disposal operations -- with activities that potentially affect groundwater. While most of these facilities have installed monitoring wells, the extent to which each of these facilities may be affecting groundwater has not yet been determined. Several instances of groundwater contamination have been detected, however. Some businesses that now manage on-site the hazardous wastes that they generate are electing to close their waste management activities rather than upgrade to meet more stringent technical operating requirements.

EPA must gather enough information to tailor each RCRA permit precisely to soil, geological and flow conditions unique to each site. These conditions may vary significantly at different points within the same site. At one complex site, more than 100 monitoring wells have been installed so far to define the underlying geology and to measure the rate and directions of waterflow. Detailed site information is then used to define acceptable operating practices.

EPA regulations grant "interim" status to active sites known or believed to be active while information is gathered for final permit issuance. Final permits will be good for 5 to 10 years. Permits may be changed if hazardous chemicals are later discovered in groundwater stemming from a disposal site. However, final permits may not be amended should compounds declared hazardous after the permit was issued be discovered. No permits have yet been issued for a Pacific Northwest disposal site where groundwater may be affected. By law, all permits must be issued by November 1988.

Pesticides:

Recent discoveries of pesticide contamination of ground water raises concern that such contamination may be widespread and of significant concentrations, yet the use of agricultural chemicals is sanctioned for economic and public health reasons. Four pesticides have been found in public drinking water supplies following complaint investigations. Our recent experience with the soil fumigant ethylene dibromide (EDB) illustrates this previously unrecognized problem.

EDB in concentrations of up to 14 ppb has been found in public and private wells in several Washington counties. Translated into cancer risk levels of about 2 per 100, these are among the highest risk levels yet found in drinking water in the Northwest. The presence or potential presence of pesticides in groundwater raises two problems. The long-term problem will be to deal with a nonpoint source of groundwater pollution that has official sanction and is viewed as critical to the agricultural economy. In the short-term, the problem is to determine the extent and significance of pesticide contamination. Complicating this problem is the fact that health risks, leachability, and similar factors about pesticides have not been fully determined.

Given the lack of knowledge about the extent of the problem and the factors influencing groundwater contamination, studies are under way at the national, regional, and State level to better define the problem. Last year in preparation for a national survey, EPA identified forty-five "migratory" pesticides likely to leach into groundwater. This survey will examine pesticide contamination of groundwater and identify relationships among chemical use, soil and geological conditions conducive to contamination. Only six pesticides (four of which are banned) are covered under current water supply standards prescribed by EPA under the Safe Drinking Water Act. National survey results are not be expected until 1988. The search for pesticides in Northwest groundwater is only beginning, and the magnitude of the problem is largely unknown.

Leaking Underground Storage Tanks:

Leakage of toxic chemicals from underground storage tanks is a problem of

growing concern. Each of the states in Region 10 has ranked underground storage tanks as a major source of contamination threats. Idaho conducted a survey in 1984 and plans to regulate tanks through legislation.

The number of incidences reported to the States and EPA involving leakage of gasoline from underground tanks has increased. Although the exact number, location and contents of leaking tanks in Region 10 is largely unknown, the large number of unprotected tanks, some buried 25 to 30 years ago, hints at the possible magnitude of this threat to groundwater resources.

Regional Agenda/Barriers

Efforts to prevent all forms of groundwater contamination are urgent because once aquifers and wells have been contaminated there may be no other alternative except to look for other sources or install costly treatment facilities. Region 10 will use a two-pronged approach to attack the problem of groundwater contamination. Prevention and cleanup will be the thrust of our program.

The key elements will include efforts to:

- Assist state and local agencies in developing comprehensive groundwater programs. With the help of EPA funding through Section 106 of the Clean Water Act, Washington, Oregon and Idaho are developing more integrated and comprehensive groundwater programs. These programs will include management tools like monitoring strategies, aquifer classification systems and groundwater quality standards.

- Investigate and take appropriate action on previously unaddressed sources of contamination such as non-hazardous waste landfills, pits and lagoons, pesticide use, and leaking underground storage tanks.

- Create a policy framework to provide consistency among EPA programs on issues such as the resource to be protected and the level of protection to be provided that resource based on the use, value, and vulnerability of groundwater supplies.

- Develop a groundwater focus to identify program needs, outputs, exchange information, coordinate actions, and measure progress toward meeting goals.

One barrier to progress is the general lack of understanding of the value and vulnerability of our groundwater resources. A patchwork of statutes, policies and strategies that impact groundwater resources exists at all levels of government and presents a major barrier. Of equal concern is the fact that many of the "patches" are totally missing.

Superfund:

With regard to specific program activities, Region 10's Superfund program will focus on removal of wastes that imperil public health, and on long-term remedial actions where no immediate threat exists. During 1985,

the State of Washington began four remedial investigations and Region 10 started two. EPA wants to make sure that waste from Superfund sites is safely disposed of instead of becoming a potential problem in a new location. A new policy requires that Superfund waste be sent only to an active hazardous waste site having no significant violations of the Resource Conservation and Recovery Act.

During FY 86, immediate removals are planned at two NPL sites. Region 10 also plans remedial investigations at six sites, and will undertake at least one long-term, remedial cleanup. Region 10 should also complete remedial design at four sites and begin design of remedial actions at three sites. In addition, remedial activities by responsible parties are to start at several sites both on and off the National Priorities List. Barriers to expediting these activities include contract laboratory capacity and quality requirements.

The major portion of this work is in Washington State which has its own "Superfund" to meet cost-matching requirements for Federally assisted cleanup. Oregon also has a State fund for investigating and monitoring disposal sites and to provide the required State match for remedial action. Oregon will tap this matching fund in 1986 for one site, United Chrome at Corvallis. Under current economic conditions, the states find it increasingly difficult to find ways to meet matching fund stipulations. Alaska plans to conduct 15 to 20 site investigations next year.

RCRA:

Permits under the Resource Conservation and Recovery Act are a mechanism for acquiring data on groundwater impacts and analyzing the potential contamination threat. Permits require facilities to monitor groundwater quality. New or expanded facilities must have impermeable liners and collect and properly dispose of liquids that seep through the site.

Over the past year, Region 10 has seen limited improvements in compliance with hazardous waste requirements. Operating facilities are better managed, but compliance actions have been taken by the States and EPA to enforce monitoring requirements at facilities with interim status.

The development of RCRA permits for operating sites has been technically challenging. The Regional office augmented its staff for this work in Fiscal 1985. Research continues at these sites to evaluate soil, geological, and waterflow conditions as a basis for permit requirements. As noted, no final, 10-year permit has been issued to an existing disposal site so far in the Pacific Northwest.

Pesticides:

States have sampled for specific pesticides such as EDB in drinking water supplies. Region 10 has conducted limited sampling for 13 migratory pesticides in drinking-water wells in the Ontario, Oregon area. Pesticides being sought are those identified as having been used in the area. Additional sampling is proposed in Oregon's Willamette Valley and in Fort Hall, Idaho. Results are expected late this year. Recognizing limited resources and competing priorities, our strategy is to complement and enhance state efforts. Region 10 will integrate regional and national

pesticide issues in State and local groundwater and drinking water management programs. Federal, state and local plans and programs will be reviewed to ascertain appropriate roles for various agencies. Oversight and information gaps will be identified. Thereafter, the Region will help States develop data on uses of migratory pesticides over vulnerable aquifers.

There are significant barriers. Many state and local agencies are reluctant to begin to look for pesticides in water supplies until EPA begins to issue health advisories. In addition, many laboratories lack equipment and expertise necessary to run the costly tests that detect migratory pesticides in drinking water.

Leaking Storage Tanks:

The Hazardous and Solid Waste Amendments of 1984 added a major new program for regulating underground storage tanks used to store petroleum products and substances regulated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). A major implementation barrier is the lack of information regarding the number, location, type, age, condition, and use of underground storage tanks in the Northwest.

As part of the overall national strategy to address this problem, a national survey of underground motor fuel tanks is currently underway. In order to prevent the installation of new underground tanks today from becoming leakers in 20 or 30 years, interim standards that govern installation of new tanks, require protection from corrosion and eliminate the burial of unprotected steel tanks became effective in May 1985. By May 1986 all owners of underground tanks currently in use, or taken out of service after January 1, 1974 but still buried, will be required to notify a designated state agency of the location, age, use, and other information pertaining to each tank.

A second barrier is the difficulty in determining that a tank is leaking and the impact and fate of the leaking product on groundwater. Region 10 and the states will take part in national work to characterize the problem and also will conduct seminars to inform state and local officials and the public of the problem of leaking tanks.

Headquarters Actions Needed

Assist the region and states in strengthening technical expertise in areas such as geohydrology, toxicology, and treatment technology.

Provide further guidance on RCRA/CERCLA interface and Superfund site waste disposal practices.

Support requests for additional resources needed to meet deadlines for issuing land disposal permits.

Issue health advisories for pesticides with groundwater contamination potential.

Issue drinking water standards for target pesticides as soon as possible.

Environmental Results

The Region 10 Office of Groundwater has been staffed with three professionals. The Regional Groundwater Task Force, established to coordinate EPA program activities with respect to groundwater problems, met six times last year. An outside liaison to deal with the states, other federal agencies and the private sector was also established. During 1985, Section 106 supplement grants have been made to Idaho, Oregon, and Washington.

Groundwater protection and cleanup activities will be carried out through final RCRA permit determinations. The Region hopes to upgrade seven hazardous waste disposal sites in Fiscal 1986 through permit issuance. By the end of FY 85, comprehensive inspections, including independent sampling by inspectors, will be complete at nearly all of the sites in the Region required to monitor groundwater. As monitoring efforts continue, the seriousness of groundwater contamination from hazardous wastes will be better understood.

Last year through the Superfund program, surface cleanup at the Western Processing site was completed. Engineering design was completed at Well 12A in Tacoma and begun at Western Processing and United Chrome. Remedial investigations were initiated at five sites.

Significantly more data about pesticides in groundwater will become available by the end of 1986. A regional mapping exercise for Washington State will correlate pesticide usage and vulnerable aquifers. Region 10 will provide interpretation of pesticide data to agricultural and health officials that will help them advise consumers on safety of water supplies and the safe use of pesticides to reduce groundwater contamination problems.

Data obtained through underground storage tank owner notifications will help to establish the magnitude of the potential problem in the region. Compliance with currently applicable interview standards for new underground tank installations accompanied by new standards should significantly reduce the leakage potential as these tanks age.

AIR CONTAMINATION

Problem Assessment

Air quality is steadily improving throughout Region 10. Public exposure to unhealthful concentrations of carbon monoxide, respirable particulates, and asbestos continues to lessen as more control strategies are put into effect. Vehicle inspection and maintenance programs to control auto emissions have been or are being implemented in almost all areas where carbon monoxide is a serious environmental problem. New PM-10 monitoring equipment is helping state and local agencies detect excess concentrations of particulate matter. Asbestos exposure is being controlled as a result of federal compliance inspections and monitoring data is being collected to identify and classify other hazardous chemicals in our air. Questions are being raised about interactions between air pollutants under certain weather conditions. Public recognition of acid deposition as a problem is increasing.

In spite of past progress, air pollution remains a serious concern. Current efforts focus on five potential or significant threats to human health and the environment:

Toxic Air Pollutants. A 1985 EPA study showed that past efforts to control common air pollutants like sulfur dioxides and particulates also resulted in significant reductions in toxic gaseous and particulate emissions. However, this same study estimated that current emissions of air toxics may be responsible for 1300 to 1700 cancer cases annually in the United States. Progress has been made in controlling asbestos air toxics through the NESHAPS program. To date, regulations have been developed for asbestos, beryllium, mercury, vinyl chloride, radionuclides and benzene. Additional controls will be needed to reduce cancer risks and to control other effects on health or the environment that may be occurring.

Limited information exists on sources, quantities and effects of toxic air emissions in the Pacific Northwest. Data on the sources and quantities of toxic emissions is now being gathered by state and local agencies. Preliminary data and information gathered in the national EPA study suggest that the wood-treatment and chemical industries are potential problem areas. Wood-treatment facilities release creosote and pentachlorophenol, which are known to contain carcinogenic constituents. Chemical facilities emit chlorinated solvents and other organic chemicals also known to be carcinogenic or mutagenic.

Some other nontraditional sources are of equal or greater interest as potential air toxicant sources. They include motor vehicles, the refining and distribution of petroleum products, residential woodstoves, drycleaners, and slash burning. Motor vehicle fuels emit varying amounts of benzene and ethylene dibromide, both of which have been shown to cause cancer in humans and animals. Under certain conditions, the smoke from combustion of agricultural residues and residential woodstoves can contain high levels of polycyclic organic materials (POM) which are carcinogenic, mutagenic or both.

Another toxic air pollutant that has received much attention from EPA the past several years is asbestos. Asbestos becomes a health hazard when fibers become airborne, and is known to cause cancer after a long latency period and respiratory diseases. Although the use of sprayed-on asbestos is now banned, it was a widely used material in schools and other structures.

Two EPA programs regulate asbestos. Exposure to asbestos in schools is addressed through a program of inspection and notification of schools and parents. The program requires mandatory notification of staff and parents regarding the location of material containing friable asbestos. School compliance inspections are carried out with staff hired under a national EPA grant to the American Association of Retired Persons (AARP). Moderate penalties are imposed for noncompliance. Penalties are mitigated downward when the schools undertake asbestos-abatement work.

Under NESHAPS, EPA has established notification and operating standards for control of asbestos emissions during demolition and renovation of commercial buildings. Revised standards governing removal procedures were promulgated in 1984. Enforcement of these demolition and renovation regulations was a priority program emphasis in 1985. Washington and Oregon have been delegated the NESHAPS program.

Respirable Particulates. Particles, 10 microns in diameter and smaller, are drawn deep into the human respiratory tract during ordinary breathing. These particles, including some attached to pesticides and other toxic substances, can be potential carcinogens or mutagens. In the Pacific Northwest, monitoring indicates problems in suburban areas, rural communities and topographically confined locales (see Table 1). EPA has proposed -- but not finalized--a primary standard for this particle size range, called "PM-10." In addition, visibility impacts from fine particles threaten integral vistas.

The proposed EPA health-related ambient standard for respirable particulates is expected to be finalized next fall. Sources include residential wood-burning stoves, fireplaces, certain industrial processes (such as wood products manufacturing), dust from paved and unpaved roads, and agricultural and silvicultural burning. There are additional concerns that particles from agricultural dust and burning may carry pesticide residues, and that these particles may also be a factor in acid deposition.

Concern about health and visibility effects from particles 10 microns in diameter or smaller is economic as well as aesthetic. As an example, under the Clean Air Act emissions from residential woodburning may have to be offset by costly further reductions in industrial emissions. Public awareness of this problem has been increasing steadily. The State of Oregon recently implemented legislation to require certification of woodburning stoves to meet certain emission limits as a means of stabilizing current emissions and allowing for future economic development. Other States in Region 10 are examining similar strategies to deal with this problem.

Residential and rural communities with no previous air pollution are beginning to have serious problems due to woodstove emissions. For example, State and local borough officials in the Mendenhall Valley of Juneau, Alaska have enforceable authority to direct residents to shut down residential woodstoves when pollution levels are excessive. Fines may be levied in case of failure to comply. Support from Boise residents encouraged the State of

Idaho to seek the inclusion of Boise in EPA's Integrated Air Cancer Study. Plans for a ski resort in the rural Methow Valley of Washington prompted community support of an air quality management plan and local ordinances to ensure that particulate standards are maintained and no violations occur.

There are virtually no data or studies on the health or ecological effects of slash and field burning. Work to characterize these effects is now underway in the Region. The health impacts of these smoke particles may not be as significant as impacts from area particulate sources that are located near populated areas. Distances separating slash and field burning activities from major population centers and smoke management policies to control the direction of smoke plumes support this contention.

Carbon Monoxide. Measured by magnitude and frequency, carbon monoxide problems in the Pacific Northwest, including Alaska, are among the worst in the United States. Cold weather conditions, difficult topography, and and lack of interest among the public and some officials raise questions as to whether the standard will be met throughout Region 10. Current levels of control are less effective in cold climates in Region 10 where carbon monoxide standards are most frequently exceeded. Figure 1 illustrates the CO air quality status of Region 10 states in 1984. The map shows the relative severity of CO NAAQS standard exceedances that occurred in 1984. In areas where there is more than one monitor, the exceedance information represents worst site data.

Most of the public and some elected officials are unconvinced that carbon monoxide is a threat to public health. Carbon monoxide is an odorless, tasteless, and invisible gas which is emitted from such sources as automobiles and residential woodstoves. At excessive environmental concentration, carbon monoxide impedes the human body's ability to absorb oxygen.

Seven Northwest cities with significant CO problems have not yet attained the national ambient air quality standard: Anchorage and Fairbanks in Alaska, Boise in Idaho, Medford and Portland in Oregon, and Seattle and Spokane in Washington. Other cities with somewhat smaller CO problems are Eugene, Grants Pass and Salem in Oregon, and Tacoma and Yakima in Washington. Table 2 shows the number of second-high violation days for nonattainment areas.

Acid Deposition. Rain becomes acidic when sulfate and nitrate particulate emissions from industrial and automotive sources chemically react with moisture in the atmosphere. Although there is not yet evidence of environmental damage to lakes and forest lands from acid rain, lakes in Oregon, Idaho and Washington do have some sensitive lakes. Figure 2 shows the alkalinity levels of lakes in these states. Deposition data indicates that no further study is needed in Oregon and Idaho at this time, but they are continuing to watch deposition rates.

There are no records of any acidified lakes in Washington to date. However, western Washington experiences acid deposition in the form of rain, snow and dry particulate fallout. In 1985, data gathered by the Washington Department of Ecology showed that rainfall in western Washington had an average pH of 4.9 to 5.3 with a low of 3.9. This level of acidity is about 10 times stronger than uncontaminated rainfall, and WDOE is currently sampling the sites shown in Figure 3. Research by the Washington

Department of Ecology (WDOE) and others indicates that much of the deposition in Washington's mountainous areas is in the form of snow. Other data suggests that alpine lakes in such areas are poorly buffered, and consequently are vulnerable to acidification from snow melt.

There is also a concern that acidic deposition could cause a decline of forest productivity, especially in areas already weakened by ozone air pollution or other environmental factors, such as drought or insects. A major reduction in sulfate emissions from the closure of the ASARCO smelter in Tacoma is expected to significantly lower measured deposition. However, studies to determine the influences of nitrate sources, dry deposition and transport/transformation are still needed.

Regional Agenda/Barriers

Toxic Air Pollutants:

Region 10 has recently completed a draft Air Toxicant Strategy which sets goals for air toxicant program development for the Region and for state and local agencies during FY 85-87. These goals, which have been largely incorporated into the FY 86 State/EPA Agreements, include state development of an air toxics data base and of programs to control new and existing sources of air toxic emissions. EPA will provide technical and monetary assistance to states and local agencies to help them achieve these goals.

This strategy also calls for increased integration and improved communication between the Air, RCRA and Superfund programs with respect to multi-media, air toxics issues. An EPA air toxics group is being formed to provide technical advice to other EPA and state and local agency staffs on issues such as monitoring, exposure assessments and health data. Under consideration is a process that would link the Air Program role to Superfund investigations and actions and RCRA permit development when air toxics are a potential problem. Contingency plans for air toxic emission emergencies need to be developed.

Major barriers have been the lack of a national strategy and regulations for controlling air toxicants. Funding for state development of air toxicant programs and Regional efforts in this quickly expanding area are inadequate.

Nearly every local education agency has completed some asbestos abatement work. Their efforts range from rewrapping boiler-room pipes to major alterations which may cost over a million dollars. Overall compliance with federal asbestos-in-schools regulations at the time of inspection is about 60 percent, based on inspections in 327 of the 1370 school districts in Region 10. Following inspections, all schools found in violation are brought into compliance.

A small number of grants and loans were made available on a competitive basis to help local school districts abate the most serious asbestos hazards. A state program to develop a contractor certification program is being partially funded by EPA in Alaska. EPA also made a one-year grant to the State of Idaho for school compliance inspections. Washington has taken the initiative to legislate and provide certification training for asbestos contractors. Barriers include inadequate local funds for abatement, a shortage of qualified removal contractors, limited state participation and lack of manpower for compliance inspections.

Since October 1984 under the NESHAPS program, Washington received 212 notifications, inspected 64 projects and found 17 violations. Oregon reviewed 166 notifications, inspected 16 projects and found 15 violations. In the non-delegated states, EPA reviewed 109 notifications, inspected 4 projects and found 5 violations. The Regional office has issued six orders and referred one case to the Department of Justice. Some 105 grant special projects money has been given to the delegated states for equipment and technical assistance in support of the NESHAPS program.

The lack of adequate inspector and investigator resources to establish an effective enforcement presence is a barrier for EPA and delegated states.

Respirable Particulates:

EPA has distributed monitoring equipment to State agencies and anticipates that initial monitoring networks will be established and operational by this fall. Regulatory agencies were given up-to-date information and explored control issues and approaches at a regional workshop in May. Northwest states are expected during Fiscal 86 to evaluate and modify these monitoring networks, identify geographic problem areas, complete emission inventories and devise approaches to control emissions of particles of 10 microns and smaller.

However, state and local regulatory agencies will await final EPA promulgation of the standard and related regulations and guidelines before starting complex, controversial and perhaps unpopular work to control these emissions.

Also awaiting resolution are national and regional standards on sampling for condensable particulates, policies on monitoring and how to deal with windblown dust, especially in rural areas, and verification of certain control techniques for which effectiveness has not been scientifically demonstrated. In addition, state and local agency resources for studies, monitoring, laboratory analyses, and personnel are constrained by inadequate allocations.

Carbon Monoxide:

Under the Clean Air Act, programs to ensure in-use effectiveness of vehicle emissions controls are required for areas where the air quality standard for carbon monoxide cannot otherwise be met.

Portland and Seattle have run motor vehicle inspection and maintenance programs for several years. Both cities are to attain the carbon monoxide standard by the end of this year. Boise's program began late in 1984, is to attain the standard by the end of 1986. Spokane, Anchorage and Fairbanks began their programs this year. Medford will start early in 1986. Medford and the two Alaskan cities are to meet the standard by the end of 1988, and Spokane by the end of 1989. The other cities with somewhat smaller carbon monoxide problems will expeditiously achieve the health-related standard without the need for inspection and maintenance programs. Table 3 displays the status of CO control strategies for attainment in these areas.

Emission controls affected by tampering are identified by the I/M program in all cities except Seattle and Spokane. Such tampering is a violation of Federal law if performed by an auto dealer and a violation of State law if

performed by a service station mechanic.

Because Headquarters is reviewing the health data underlying the ambient air standard, elected officials and regulatory agencies are reluctant to commit scarce resources to reduce carbon monoxide, especially by means that directly affect many voters. Headquarters consideration of revised vehicle emission standards worries state and local officials in Region 10. The Clean Air Act needs to be revised because several sections are outdated and do not address newly discovered carbon monoxide problem areas.

Acid Deposition:

Region 10 is directing the National Lakes Survey for the Western region. Selected lakes will be sampled from September - November 1985. Preliminary results are expected in 1986.

Washington legislators passed two bills promoting acid deposition research and authorized the involvement of local researchers and forestry asociations in efforts to examine the effects of acid deposition. Region 10 is funding work by the Washington State Department of Ecology to monitor wet deposition and to conduct detailed examinations of lake sensitivity to determine potential deposition impacts and develop control strategies if needed. Current statistics from these studies indicate that Region 10 is out in front of any serious environmental damage. It is the goal of the Department of Ecology and EPA to continue rain monitoring and lake studies to better understand the process of acidification and to provide a system that will indicate acidity in the environment.

Since our Region is not part of the National Acid Precipitation Assessment Program, Region 10 has been funding all acid deposition research out of Section 105 special project monies. Acid rain studies in the Midwest and Northeast appear to have higher priority for federal spending. The problem in Region 10 is that state decision-makers need more data to shape future legislation confidently. The Northwest seems particularly sensitive to dry acid deposition; more so than the Northeast because of climactic differences. More study also is needed on the influence of nitrate sources, as the West has more nitrate sources, such as automobiles and power plants, in relation to the number of sulfate sources found elsewhere in the nation.

<u>Headquarters Actions Needed</u>

Toxic Air Pollutants:

Finalize and implement the June 1985 national strategy on air toxicants.
Help develop local contingency plans for air toxic emergencies.

Increase funding, guidance and technical assistance needed to help the states and local agencies gather data on sources and quantities of air toxicants and develop regulatory programs to control them.

More NESHAPS resources for enforcement activities and inspectors are needed for compliance rates to increase.

NESHAPS regulations should be strengthened to address asbestos exposure in other settings like public buildings and hospitals.

Assure continuation of the AARP compliance inspection program for at least three years.

Expand funding for grants and loans to finance high-priority asbestos abatement projects by local school districts.

Expand funding for state grants to support asbestos programs for contractor certification and compliance inspections.

Respirable Particulates:

Expedite promulgation of final standards, regulations and implementation policies. Policy issues must be resolved by next fall if state programs are to proceed effectively.

Increase public awareness of the problem, and the future economic implications of failure to control PM-10 emissions.

Carbon Monoxide:

Re-assess the validity of the existing carbon monoxide air quality standard with additional medical and/or environmental studies.

Conduct an Agency-wide public information program. Publications should provide convincing evidence of the health-related impacts of carbon monoxide exposure.

Deny requests to reduce motor vehicle emission standards. Unless benefits nationally will offset the political and economic cost of steps to achieve and maintain healthful air quality in nonattainment areas, these requests appear highly inappropriate.

Request that Congress update outdated sections of the Clean Air Act to provide a more flexible timeframe for dealing with newly discovered carbon monoxide problem areas.

Acid Deposition:

Greater attention to acid deposition research west of the Rockies by the Office of Research and Development and the Acid Rain Office appears necessary and warranted.

More funding is needed to maintain current levels of environmental monitoring of dry and wet deposition and the resulting impacts on lakes and forest lands.

Environmental Results

Toxic Air Pollutants:

Alleviate specific problems defined in the inventory process.

Reduce public exposure to air toxicants through effective state and local programs to regulate point emissions like those from area and non-traditional sources such as woodstoves.

Increasing rates of compliance with federal asbestos regulations.

Respirable Particulates:

Identify nonattainment areas and potential problem areas. Develop and implement effective control strategies in these areas leading to progressive air quality improvements.

Reduce public exposure to PM-10 through traditional and novel control techniques for industrial and area sources. Achieve considerable control of residential woodstove/fireplace emissions by elevating the public's awareness and enlisting their cooperation.

Carbon Monoxide:

Reduce carbon monoxide concentrations in all major cities of Region 10 by 1988. The potential number of persons exposed to unhealthy levels of carbon monoxide will decline from 4,266,000 in January 1983 to 456,000 by 1988 (see Table 4).

Acid Deposition:

Region 10 presently has no record of environmental damage to lakes or forests from acid rain, although the rain monitoring network suggests we are at threshold levels where we might expect impacts on poorly buffered lakes. Such sensitive lakes usually have alkalinity levels less than 200 microequivalents per liter, but most typically less than 50 microequivalents per liter. These lakes would serve as an early warning system for severe acid contamination. Continued lake monitoring in combination with rain monitoring would give us an early indication of the need to reduce current emissions through existing or new legislation.

TABLE 1

Estimates of PM-10 Exceedance Probabilities
for Prospective Region 10 Monitoring Sites

CITY OR COUNTY	STATE	0-20%	20-95%	>95%
Anchorage	Alaska	(1)	(4)	(2)
Fairbanks	Alaska		(4)	
Juneau	Alaska			(3)
Bannock County	Idaho	(1)	(1)	
Boise	Idaho		(1)	(1)
Caribou County	Idaho	(1)	(1)	(1)
Idaho Falls	Idaho		(1)	
Kellogg	Idaho		(1)	
Lewiston	Idaho		(2)	
Moscow	Idaho		(1)	
Nampa	Idaho	(1)		
Pocatello	Idaho	(1)	(1)	
Shoshone County	Idaho		(1)	(2)
Twin Falls	Idaho	(1)		
Bend	Oregon		(1)	
Eugene	Oregon	(1)	(1)	
Grants Pass	Orgeon	(1)		
Klamath Falls	Oregon	(1)		
La Grande	Oregon	(1)		
Medford	Oregon		(1)	
Pendleton	Oregon		(1)	
Portland	Oregon		(3)	
Bellevue	Washington		(1)	
Bellingham	Washington	(1)		
Clarkston	Washington		(1)	
Kennewick	Washington		(1)	
Longview	Washington	(1)		
Seattle	Washington	(2)	(2)	(1)
Spokane	Washington			(3)
Spokane County	Washington		(1)	
Tacoma	Washington	(1)	(1)	
Vancouver	Washington			(1)
Walla Walla	Washington		(1)	
Yakima	Washington		(1)	
Yakima County	Washington		(1)	

NOTE: Criteria = 0-20% probability of exceeding 24-hour PM-10 standard
20-95% probability of exceeding 24-hour PM-10 standard
> 95% probability of exceeding 24-hour PM-10 standard

() - Indicates number of sites in the city or county calculated for a given probability range.

Source: 1981 - 1983 SAROAD

TABLE 2

Region 10 CO Nonattainment Problem Areas

Major CO Problem Areas	1980 Census SMSA Population	Days of Second High Violations (mg/m^3) 1982 2nd high	1982 violation days	1983 2nd high	1983 violation days	1984 2nd high	1984 violation days
Anchorage, AK	174,000	20.8	44	20.7	56	19.7	35
Fairbanks, AK	53,000	18.5	39	20.3	37	13.1	7[5]
Boise, ID	173,000	14.7	17	17.8	9[4]	11.3	7[4]
Medford, OR	133,000	15.2	22	14.5	29	13.3	18
Portland, OR	1,050,000	12.0	5	14.0	12	11.3	4
Seattle, WA[1]	1,400,000	13.8	15	13.2	14	11.6	4
Spokane, WA[2]	267,000	16.4	47	17.7	36[3]	19.5	32
Other Areas							
Eugene, OR	275,000	9.6	0	10.9	2	9.1	0
Grants Pass, OR	15,000	14.9	29	12.9	11	12.8	12
Salem, OR	250,000	8.2	0	8.5	0	7.5	0
Tacoma, WA	402,000	13.1	6	11.2	2	11.5	5
Yakima, WA	173,000	13.8	3	11.8	2	16.0	3

1 Includes Bellevue, excludes Everett
2 Monitoring discontinued - Fernwell Bldg. 6/83
Monitoring began - Hamilton Street site 12/1/83
3 Analysis includes Fernwell Bldg. and Hamilton Street sites
4 Data missing in CO season
5 One site discontinued 4/84

Source: SAROAD

TABLE 3

Major CO Nonattainment Area Control Strategies

Status of I/M* Programs

Area	Attainment Plans Submitted	Attainment Plans Status	I/M Start-up Date	Anti-Tamp**	Attainment Date
Anchorage, AK	yes	proposed aprvl	July 1985	yes	1988
Fairbanks, AK	yes	proposed aprvl	July 1985	yes	1988
Boise, ID	yes	approval	Aug. 1984	yes	1986
Medford, OR	in process	projctd aprvl	Jan. 1986	yes	1988
Portland, OR	yes	approval	July 1975	yes	1986
Seattle, WA	yes	approval	July 1982	no	1986
Spokane, WA	yes	approval	July 1985	no	1989

* Motor vehicle Inspection and Maintenance Programs.

** Anti-Tampering Program conducted during I/M inspections.

Source: Region 10 State Implementation Plans

TABLE 4

Estimated Population Exposure
to Unhealthy Carbon Monoxide Levels

1983-1988

DATE	CITY	POPULATION SIZE
January 1983	Anchorage	174,000
	Fairbanks	53,000
	Boise	173,000
	Eugene	275,000
	Grants Pass	15,000
	Medford	133,000
	Portland	1,050,000
	Salem	250,000
	Seattle	1,400,000
	Spokane	267,000
	Tacoma	403,000
	Yakima	73,000
	TOTAL	4,266,000
January 1986	Anchorage	174,000
	Fairbanks	53,000
	Boise	173,000
	Grants Pass	15,000
	Medford	133,000
	Spokane	267,000
	Tacoma	403,000
	TOTAL	1,218,000
January 1988	Anchorage*	174,000
	Grants Pass*	15,000
	Spokane	267,000
	TOTAL	456,000

* Marginal Nonattainment

Source: 1981-1983 SAROAD

Figure 1

Region 10
1984 Air Quality Status
Carbon Monoxide

Summer 1985

Area Complies with or
Is Considered to Comply with Standard

8-Hour Primary Standard Violated

Alert Level Exceeded

Note: **Bellevue was considered together with Seattle.**

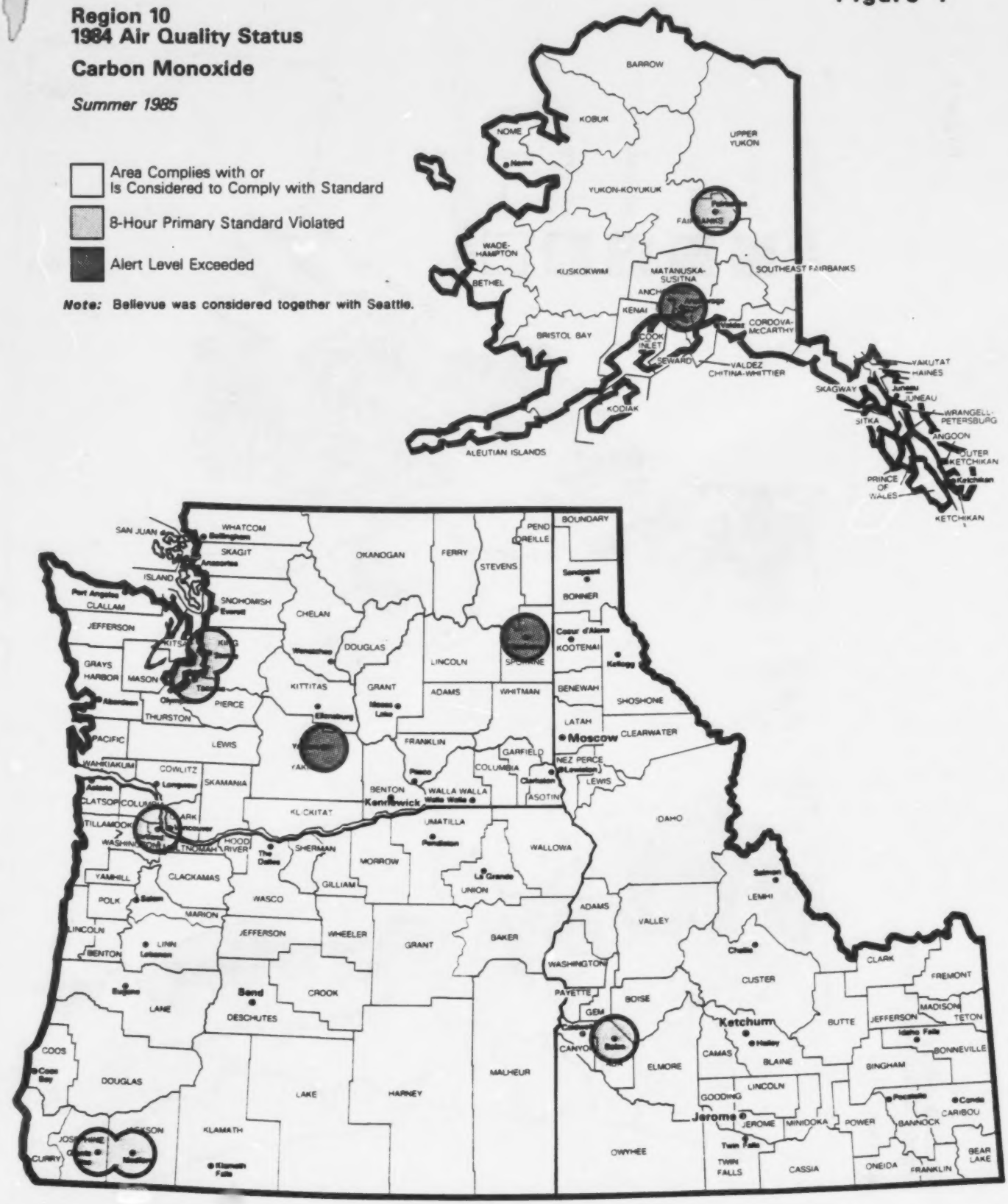


Figure 2

Total Alkalinity of Region 10 Surface Waters

June 1983

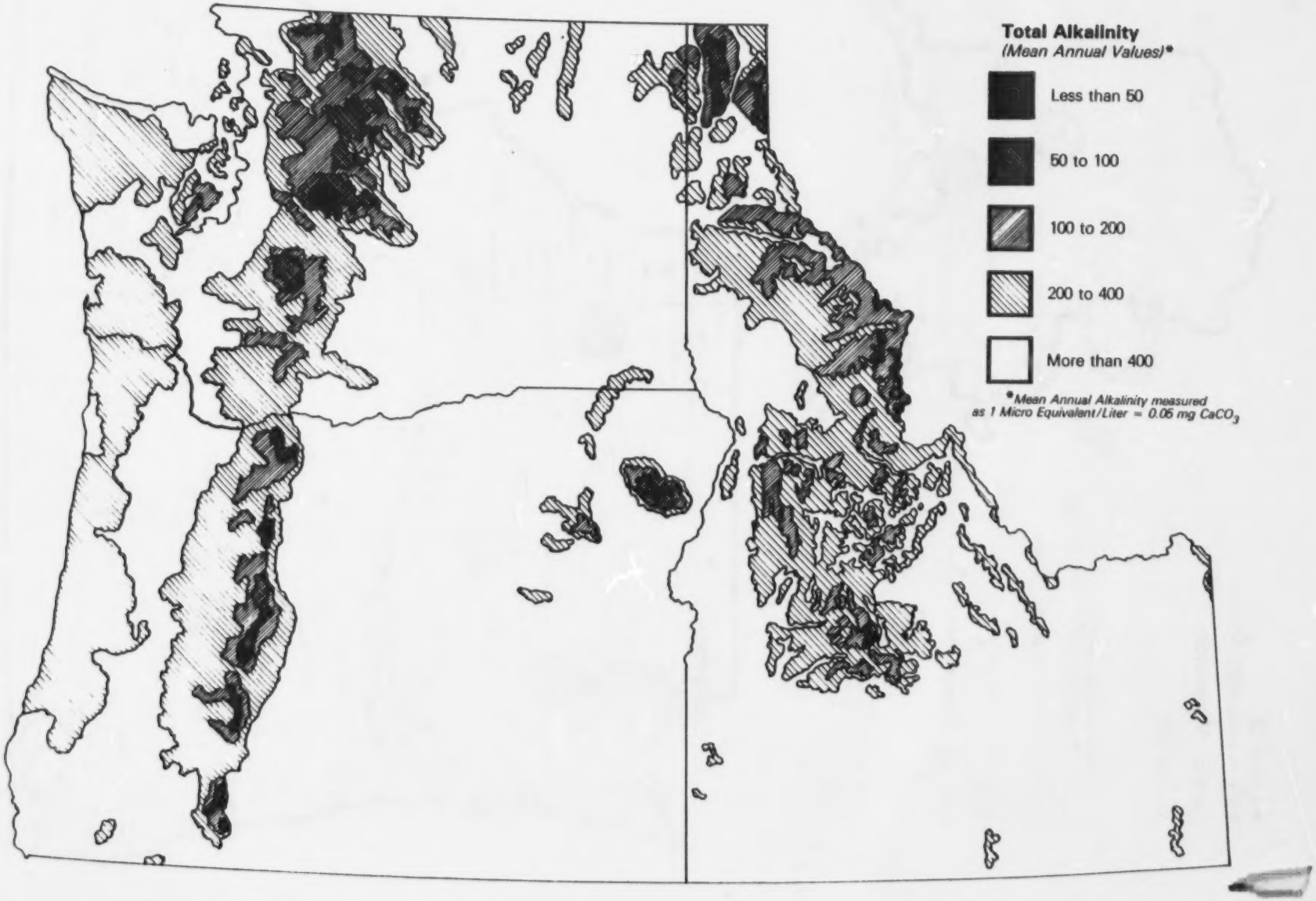

Total Alkalinity
(Mean Annual Values)*
Less than 50
50 to 100
100 to 200
200 to 400
More than 400
*Mean Annual Alkalinity measured as 1 Micro Equivalent/Liter = 0.05 mg $CaCO_3$

Figure 3

Washington State
Lake Sampling Regions and
Study Sites

June 1983

▲ Intensive Study Lakes

■ Seasonal Study Lakes

Lake Sampling Regions

BACTERIAL AND CHEMICAL SHELLFISH CONTAMINATION

Problem Assessment

(This section deals with contamination of Pacific commercial shellfish grounds in Alaska, Oregon and Washington. Puget Sound shellfish are presented separately as part of the Puget Sound geographical focus discussion).

Highly productive shellfish resources in estuaries of the Pacific Northwest are susceptible to bacterial and chemical contamination. As of July 1985, approximately 309,000 commercial acres had been classified along the Pacific coast by State agencies as open, closed or conditionally approved for harvest. Excluding Puget Sound, 57 percent of the total classified acreage is open, 30 percent is conditionally approved, and 13 percent is closed to commercial harvest. Washington contains the highest percent of classified acres (154,000 acres or 50%), followed by Alaska (127,000 acres or 41%) and Oregon (28,000 acres or 9%).

Shellfish are good surrogate indicators of the effectiveness of water quality management programs because they are filter feeders capable of accumulating bacteria, viruses and toxic substances. The level of such contaminants present in waters surrounding shellfish beds therefore indicates whether shellfish at a particular site are safe for human consumption. Over the past several years, conditionally-approved shellfish beds in Oregon and Washington have been closed many times due to microbiological contamination that might cause illness in humans.

Commercial shellfish beds in Oregon and Washington produce clams, oysters and mussels. These beds are located in estuaries subject to point and nonpoint source contamination. The Alaskan commercial harvest is predominantly razor clams. All classified commercial acres in Alaska are open to harvest. There, paralytic shellfish poisoning (PSP), not toxic or bacterial contamination is the present threat. PSP is a naturally occurring toxin produced by a group of one-celled algae. More information about what stimulates these algal blooms is needed.

Regional Agenda/Barriers

Washington and Oregon are working to protect shellfish resources through basin water quality management plans, upgrading of public wastewater treatment facilities and administering the Coastal Zone Management and Section 404 wetlands programs. Ongoing permit and enforcement programs are relied upon to control point source discharges. EPA is providing monitoring and technical assistance to these states through annual State/EPA Agreements and water quality management funding. Section 205(j) funds are being used to help develop and implement best management practices for nonpoint sources.

In Oregon, efforts continue to control farm waste and to improve municipal sewage treatment capacity at Tillamook and Coos Bays, Oregon. Problems at Coos Bay are from combined sewer overflows, inadequate municipal treatment plants, failing septic tanks, and agricultural nonpoint sources. Tillamook Bay is similarly impacted by nonpoint source dairy farm waste and five municipal sewage treatment plants. Coos Bay and North Bend, the two municipal dischargers to Coos Bay, are high on Oregon's priority list for

facility improvements. These are to be completed by 1988 and water quality improvements should be noticeable soon thereafter. Implementation of a waste control plan at Tillamook Bay is nearly complete, and follow-up monitoring on that project will conclude next year. Improvement in these two bays is already measurable. From 1977 - 1985, there has been a 30 percent shift from closed to conditionally approved acreage.

Washington continues to work on the Grays Harbor Management Plan. The Department of Social and Health Services in that state runs a shellfish monitoring program. Problems in Grays Harbor include fecal coliform bacteria, low dissolved oxygen, high water temperatures during low-flow periods and toxic chemical pollutants. Discussions with local industries have been initiated, and sewage and other industrial discharge permits are being reviewed.

Headquarters Actions Needed

Support flexibility in using available funds, such as those allocated for Clean Water Act Section 205(j), to develop nonpoint source controls and water quality monitoring programs.

Support research of the growth requirements of the algae responsible for paralytic shellfish poisoning.

Provide funding to study the long-term effects in Willapa Bay of the pesticide Sevin on oyster beds to control burrowing shrimp. An EIS has been completed, and some unknowns that require further research have been discovered.

Environmental Results Indicators

Increased number of acres classified as conditionally approved or open for shellfish harvesting.

Reduced incidence of closure of commercial shellfish beds due to bacterial contamination.

NONPOINT SOURCE POLLUTION

Problem Assessment

To date, traditional approaches to water pollution problems such as point source permitting and compliance review have been responsible for most of the water quality improvements in Region 10. However, many streams are still extensively affected by pollution from nonpoint sources. Nonpoint source pollution accounts for an estimated 60 percent of the Region's water quality problems. A different emphasis is clearly required by EPA and the States if the goals of the Clean Water Act are to be achieved.

Nonpoint pollution in the Region is most often associated with agricultural and silvicultural activities. Urban runoff, septic tank failures, and construction and mining activities are more localized but may cause serious contamination problems.

Agricultural cropland totals about 19.4 million acres in the Region. Excessive soil erosion on this cropland amounts to 2.2 million acres. Irrigation return flow is an agricultural practice contributes substantially to pollution in several major rivers. The Yakima and Palouse rivers in Washington; the Owyhee, Malheur and Klamath basins in Oregon; and Rock Creek and the Boise, Portneuf, Weiset and Payette rivers in Idaho suffer from significant, agricultural nonpoint source pollution.

Erosion from improperly built or maintained logging roads is the major concern in silvicultural operations. Region 10 has more than 65 million acres of commercial forest. Depending on economic conditions in the regional forestry industry, approximately 8000 miles of new logging roads may be built annually and 3800 miles rebuilt. Decreased demand for Northwest timber in recent years has resulted in more road rebuilding than new construction. Many rebuilt roads are poorly located near streams and on steep slopes, increasing streambank erosion and their potential to impair water quality.

The major water quality problems associated with agriculture and silviculture are turbidity, nutrients, bacteria, higher than normal temperatures and pesticide contamination. Turbidity interferes with the feeding ability of fish and other aquatic organisms. Sediments associated with turbidity destroy aquatic habitat and damage respiratory systems of fish. Excess nutrients produce algal blooms and aquatic-weed growth that impair fisheries and recreational uses. High levels of fecal coliform bacteria from concentrated animal feeding operations adversely impact shellfish harvesting areas and affect contact recreational uses of receiving waters. Logging operations that remove streamside vegetative cover elevate water temperatures and may reduce the level of dissolved oxygen available. Migratory pesticides may also be toxic to fish.

Regional Agenda/Barriers

States and local agencies have primary responsibility for the control of nonpoint sources of pollution. EPA's role is to provide technical and financial assistance and oversight to ensure that Clean Water Act goals are met. Region 10's strategy for controlling nonpoint sources emphasizes technical assistance (such as field reviews and comments on best management practice plans) to States, local governments and federal agencies to carry out effective programs.

States are encouraged to use Clean Water Act grant funds to solve nonpoint source problems. Each state has projects partly supported with EPA grants to address agricultural and silvicultural nonpoint source problems. The effectiveness of these programs varies with state enforcement resources and priorities. Water quality management plans for concentrated animal feeding operations are being developed for priority areas in each state. Moses Lake in eastern Washington is being cleaned up with the help of an EPA/State grant for a cooperative agricultural control program.

Alaska, Idaho and Washington plan activities next year to further strengthen the water quality elements of their silvicultural programs. The nineteen national forests in the Region are developing long-term resource management plans with water quality considerations as part of the planning process. EPA and State water quality agencies will review the forest plans in FY 86 to ensure that water quality concerns are adequately addressed. EPA will also continue to encourage and assist State water quality and forestry agencies to strengthen field enforcement of forest practice rules and regulations.

Most solutions to nonpoint source water quality problems rely upon the willingness of individual landowners to take corrective actions and bear the cost of those actions. However human health, recreational and fishery benefits of individual actions often accrue to society as a whole, rather than to an individual who has acted to control a pollution source. As a result, responsible individuals are either unwilling or unable to voluntarily bear the cost of correcting a problem. The absence of regulatory requirements for nonpoint source programs coupled with the lack of adequate public funding to share the cost of applying best management practices are the major barriers to implementation.

Headquarters Actions Needed

- Clean Water Act funding programs for nonpoint source controls must be reviewed. Increased funding levels are needed to help State and local agencies implement effective programs.

- Guidance on the use of existing EPA grants (106, 205(j) and 314) must continue to emphasize the need for nonpoint source control programs. States should be given additional incentives to develop nonpoint source programs. Perhaps a portion of 106 funds could be specifically designated for state nonpoint source programs.

- EPA Headquarters must take the lead in working with other federal agencies that produce significant nonpoint source problems. Substantive and quantifiable annual work plans should be tailored to regional priorities and needs.

Environmental Results

Over the long-term, nonpoint source programs should help to achieve:

Reduction in the number of river miles not meeting designated water uses due to contamination from nonpoint sources.

Reduction in the number of acres of lakes/ponds and reservoirs not meeting designated water uses due to nonpoint sources.

Decreased loadings of sediment, nutrients, bacteria and pesticides in rivers, streams and lakes impacted by nonpoint source activities.

PLACER MINING

Problem Assessment

Placer mining for gold and other precious heavy metals has an important historic and present-day role in the Alaskan economy. According to a study prepared by Berger & Associates in 1983, the placer mining industry generated direct expenditures for goods, services and labor of over $80 million in 1982, and it contributes substantially to the well-being of Fairbanks, Nome and several smaller communities.

Placer mining activities introduce solid materials (sediment and organic debris) into streams during sluicing operations. These solid materials can significantly reduce the abundance and diversity of aquatic life and alter a stream's physical characteristics. Placer mining operations discolor streams and increase arsenic concentrations above normal background levels. Placer mining operations also reroute stream channels and increase erosion from ground lacking soil and plant cover.

Certain species of fish migrate from highly turbid streams. However, migration may be impeded in areas with extremely high sediment loadings and is not possible at all stages of the fish's life cycle. Fish are therefore directly and indirectly vulnerable to placer mining operations. For example:

* Suspended solids interfere with the ability of "sight feeder" species to recognize food sources and capture prey. Suspended solids also accumulate in gill tissues, decreasing respiratory ability.

* Settleable solids block water movement in fish spawning beds. This condition reduces the amount of dissolved oxygen available to fish eggs, increases water temperatures, and alters the pH balance critical for survival of fish eggs.

Regional Agenda/Barriers

The Region's primary goal is to reduce the impact of placer mining activities on fisheries. Excluding streams known or suspected to be affected by naturally occurring turbidity like glacial runoff, there are approximately 4100 stream miles in Alaska which exhibit, to varying degrees, the impacts of 509 placer mining operations permitted by EPA as of May 1985.
Figure 4 shows the distribution of NPDES permitted mines in Alaska.

Region 10 conducted 60 site inspections at remote Alaska placer mines in 1984 and plans to inspect about 30 sites in 1985. Region 10 has issued 538 federal clean water permits to limit placer mining discharges of suspended solids and arsenic and reduce turbidity. EPA is also proposing a consent order to placer miners. When signed by the miner and EPA, this order sets out an agreement and schedule for bringing a placer mining operation into full compliance with the terms of their NPDES permits. The order includes a schedule for meeting turbidity and arsenic limitations that is written in individual permits. Placer mining operators located on priority streams and drainages are required to meet these permit limits by June 1, 1986. All others have until November 30, 1986 to meet the conditions of their permits.

Headquarters Actions Needed

- Promulgate effluent guidelines for placer-mine discharges.

- Revise the form entitled National Pollutant Discharge Elimination System Application for Permit to Discharge -- Short Form C (OMB No. 2000-0023). The Short Form C should include the following items:

a) Number 1 - The Name and Address of the facility operator.

b) Number 7 - A column designated 20 cubic yards per day or less is needed under Raw Materials Consumed. This would enable the Region to separate NPDES Permit applications from small operations, which are not being issued permits at this time.

Number 8 - Short Form C should include units of measurement in cubic yards per day.

Environmental Results

Ongoing inspection and enforcement activities should help yield the following results:

Decreased loadings of arsenic and suspended and settleable solids in rivers and streams affected by placer mining operations.

Increased water clarity, survival of fish eggs and populations of healthy fish where historically fish have thrived, but are no longer present in streams and rivers associated with placer mining activities.

Reduced number of rivers and streams affected by placer mining operations having high turbidity and low dissolved oxygen values.

NPDES Permitted Placer Mines In Alaska

May 1985

Figure 4

PCB STRATEGY FOR UTILITIES AND SCRAP/SALVAGE OPERATIONS

Problem Assessment

Polychlorinated biphenyls (PCBs) persist, bioaccumulate, and bioconcentrate in animals and humans. Based on animal studies, EPA considers PCBs a possible human carcinogen. Exposure to PCBs can also cause a variety of other human health problems. PCBs have been found at high levels in Columbia River sturgeon by the U.S. Fish and Wildlife Service and are believed responsible for the decline of Columbia River mink and otter. PCBs are also found to persistently occur in Puget Sound fish tissues and sediments, thus presenting a continuing threat to this critical environmental resource. In general, PCBs are widely present throughout the environment.

PCB regulations, which were promulgated in 1978 under the Toxic Substances Control Act (TSCA), ban the further manufacture of PCBs in the United States and strictly regulate the use and disposal of existing PCBs and equipment containing PCBs. Because PCBs have had a wide range of uses and applications in various industries, compliance activities have been directed at ten diverse industry groups which together represent the bulk of PCBs in the Pacific Northwest. The number of sites considered appropriate for inspection is more than 15,000. These sites include food and feed facilities, federal installations, utilities, scrap metal dealers, and industries that use large amounts of electric power. Were we to continue to inspect at the 1985 rate, it would require over 150 years to inspect all presumed PCB sources in Region 10.

During 1984-85, Region 10 decided it would be fruitful to place increased emphasis on compliance, enforcement and cleanup activities relating to utilities and scrap/salvage operations. Utilities account for a large share of capacitors and transformers containing PCBs, and utilities and scrap/salvage operations have had continuing, high rates of noncompliance with federal PCB regulations. Utilities are increasingly implicated as parties to violations of the Toxic Substances Control Act at scrap/salvage sites. Such violations frequently involve many pieces of PCB-containing equipment over long periods of time, and such sites often require major cleanup efforts under Superfund.

Regional Agenda and Barriers

Region 10 has developed a multi-component strategy to address environmental contamination at scrap/salvage sites. The strategy offers the regulated industry opportunities for cooperative participation with EPA in addressing this problem, and is backed up by an aggressive compliance and enforcement effort. This strategy focuses on utilities and scrap/salvage operations and extends from the balance of FY 85 into 1986. At the same time, other industry groups will continue to be addressed by ongoing compliance and enforcement efforts.

The four components of the new strategy include:

- Information Gathering. Region 10 will: develop a comprehensive inventory of facilities using or handling PCBs with the assistance of selected utilities, identify disposal sites, select sites for priority inspections, and encourage utilities to volunteer information on other sites.

- Technical Assistance. EPA will work with utilities to target cleanup actions at the most environmentally significant or sensitive sites, develop consent agreements for targeted sites, and train utilities to perform "equivalent" PCB inspections.

- Compliance/Enforcement. Region 10 will increase the proportion of utilities and scrap/salvage operations scheduled for inspections, increase penalty collections, decline to mitigate civil penalties for activities utilities already should be doing (e.g., staff training, system-wide audits), and reinspect selected violators to assure quick compliance.

- Outreach. Press releases will be used creatively to better educate the public and the regulated community about individual cases and to convey developing policy. A dialog will be opened with the insurance industry regarding the financial benefits of voluntary cleanups. The direction and momentum of the new strategy will be conveyed in frank speeches to industry.

The fact that the new strategy outlined above will be very resource intensive presents a potential barrier. Some aspects of the strategy may have to be compromised during implementation if resources continue to be cut.

In the overall PCB program, Region 10 staff met and exceeded the FY 85 Headquarters goal for regional PCB inspections in May 1985. In addition, leverage gained from assessment of TSCA penalties resulted in several utilities joining with EPA to cleanup a major contamination site.

Headquarters Actions Needed

Headquarters Office of Toxic Substances (OTS) should set compliance goals for utilities and other industry sectors in all regions to drive enforcement programs and foster creative approaches. Currently, there are no compliance goals similar to those in air and water programs.

OTS should consider establishing the Region 10 utility and scrap/salvage program as a pilot project and provide a work-year of resources during 1986 to help implement it.

Environmental Results

No environmental goals for PCBs have been established at either the Headquarters or regional levels. As noted above, compliance goals have also not been established. Problems in setting goals stem from the lack of information on safe threshold levels (there may be none), the lack of information and consensus on appropriate cleanup levels, the widespread presence of PCBs, and the difficulty in tracking sources of contamination (some of which may be one-time occurrences from as much as 50 years ago).

Possible approaches to monitoring for environmental results would involve very long-term and expensive studies to assess whether PCB levels in humans, birds and fish were being reduced. Another less conclusive indicator might involve monitoring the amounts of PCBs which are incinerated or otherwise properly disposed. Reductions in the inventory of such materials could be presumed to indicate a decrease in overall threat to the environment.

While the problem of which indicator to use is being addressed, EPA has

settled for interim goals that address compliance and enforcement targets (i.e., number of inspections and civil complaints issued, etc.). In this regard, Region X staff have done well. As noted earlier, the Headquarters PCB inspection target was achieved in May 1985. In addition, through application of leverage gained from assessments of TSCA penalties, a cleanup has been initiated with a consortium of utilities at a major contamination site in Region 10. More such cleanups will result from aggressive implementation of the PCB Strategy for Utilities and Scrap/Salvage Operations.

WETLANDS PROTECTION

Problem Assessment

With recognition of the loss of more than half of the historic original wetlands of the United States, the irreplaceable utility of wetlands has become more fully understood. Wetlands are natural flood-prevention and pollution-filtering systems and contribute significantly to ground-water recharge. An evaluation along the Charles River in Massachusetts a few years ago showed wetlands soaked up annual floods that otherwise would have caused millions of dollars in damage, and that their capacity to treat and clean waste water also was worth $17,500 per acre each year. Wetlands also provide habitat for sport fish, wildfowl, furbearers, and myriad other wildlife. One third of all endangered species depend on wetlands for some part of their life cycle.

In the Northwest, the most significant examples of wetland loss range from the total destruction of the Puyallup estuary in Tacoma and the near-total loss of the Duwamish estuary in Seattle to 30 percent at Grays Harbor and 24 percent in the Columbia River.

In spite of past wetlands losses and growing appreciation for the environmental utility of wetlands, intense pressure for additional filling and construction continues. The U.S. Army Corps of Engineers and EPA share Clean Water Act authority to regulate wetlands activities directly. This authority is exercised in cooperation with other agencies at the federal, state and local level. Each year the Corps receives -- and Region 10 reviews -- more than 1200 applications for permits to undertake activities that might affect wetlands. Many activities that affect wetlands are not covered by Section 404 of the Clean Water Act. One important exemption is the drainage of wetlands, especially for agricultural purposes.

Of particular concern in Region 10 are oil and gas development activities affecting Alaskan tundra along the Arctic Ocean, log storage and transfer activities in southeast Alaska, the disposal of dredged material and intertidal habitat protection in Washington's Puget Sound; estuarine protection and dredge/spoil disposal along the Columbia River, and the continuing need to inventory and map wetland functions and assign relative values. This planning approach has been undertaken in only a few Alaskan locations through a variety of federal and state agency funding programs.

That wetland values are not widely understood may be the greatest barrier to effective action to preserve remaining wetlands. This is reflected in the fact that past enforcement activities have not been as vigorous as in some other environmental programs, and violations have resulted in additional losses of wetlands.

Regional Agenda/Barriers

Region 10 has progressively developed a more active posture in wetlands protection during the past two years. Key activities include:

- Identification of wetlands has resulted in a priority listing of wetlands of significant value to advise developers and others planning activities that might affect such sites.

- Stringent review of wetlands projects. EPA and other natural resource agencies evaluate the necessity for any disruption, and identify feasible project alternatives and mitigation measures needed to replace natural wetlands with nearby man-made substitutes of equivalent ecological potential.

- Implemented a Region 10 mitigation policy to support staff efforts to obtain mitigation for lost functions and values. However, inadequate resources for travel have limited our ability to assure mitigation is effectively implemented.

- Expanded use of the EPA-Department of the Army Section 404(q) referral process to resolve important differences between EPA recommendations and Corps actions as to permitting and mitigation of actions affecting wetlands. Region 10 initiated two such reviews in FY85 and expects to do more.

- Use of the Section 404(c) "last-resort" veto by EPA of wetlands projects that threaten significant adverse impact. Such a process was initiated this year on a project that could have had serious impacts on waterfowl use of an Alaskan wetland. An agreement with the project sponsor for monitoring of the environment and waterfowl plus a change in the Corps Section 404 permit made it unnecessary to pursue the action.

- Initiated a 404 enforcement program which has resulted in the issuance of several compliance orders in FY 85.

We will use EPA authority to elicit facts about apparent wetlands-rule violations, and to remedy such violations, to enhance Corps enforcement efforts.

Region 10 will develop and carry out a public awareness program to explain wetlands values and Federal regulations in cooperation with local, state and other federal agencies. A goal of this activity is increased public reporting of wetlands violations.

We will sponsor at least one state wetlands enforcement conference to bring various Federal and State agencies together to coordinate wetlands protection and enforcement activities and encourage data sharing. The goal of these efforts is to increase the effectiveness of enforcement of Section 404 of the Clean Water Act.

Unified enforcement activities are particularly needed -- but EPA-resource consumptive -- in remote areas of Alaska. There, "gypsy" developers sneak-build on wetlands in violation of regulations and can get their actions ratified later with a Corps permit. Developers who properly apply in advance for permission to build similar developments often will find their plans disapproved. The next highest enforcement priority is Washington, where most unauthorized filling activities occur. The State of Oregon is working hard to become the first state nationally to be delegated the 404 permit program for non-navigable waters there.

Headquarters Actions Needed

* Successfully renegotiate the expired memorandum of agreement

between EPA and the Corps that underlies 404 wetlands protection and enforcement activities. Rewrite 404 (b) (1) rules to strengthen EPA's role as protector of wetlands.

* Develop a new memorandum of agreement with the Department of Justice to allow Regional Offices to refer 404 violations directly to local U.S. District Attorneys.

* Promulgate a national policy on the mitigation of adverse environmental impacts from wetlands developments.

* Delegate Section 404(c) veto to the Regional Administrator level.

* Provide additional staff training in wetlands ecology and enforcement, and adequate travel funds to implement national and regional policies.

* Provide additional funds for enforcement-related travel or develop alternative means of establishing EPA enforcement presence.

* Develop a wetlands-protection proposal as a replacement for the Section 404 language in the Clean Water Act.

Support an interagency effort to determine relative wetland values. These values could later be used to develop a general permitting approach for lower-valued wetlands.

Environmental Results

Reduce by at least 50 percent the yearly loss of wetlands acreage in Region 10 and increase the acreage restored or protected in FY85.

Increase by 50 percent the number of wetlands violations reported by other federal and state resource agencies.

Obtain a 50 percent increase in the number of Corps permits containing EPA-approved mitigation plans.

Obtain 100 percent success using 404(q) referrals and 404(c) actions in terms of avoiding adverse impacts to high priority wetlands or completely replacing wetland functional values.

Obtain a 100 percent increase in the number of Section 404 violations reported to Region 10 by the general public as a result of educational activities conducted by the Region.

Problem Assessment

The Puget Sound region, particularly the eastern shore from Tacoma to Everett, is the most densely populated and heavily industrialized area of the Pacific Northwest. The Sound receives wastes from approximately 2.5 million people, as well as from land and facilities associated with agriculture and the forest products, food processing, metals, oil, chemical, construction and maritime industries. Erosion, urban runoff and atmospheric emissions also contribute contaminants. Together, these contaminants limit beneficial uses of the Sound and cause detrimental or potentially detrimental water quality alterations and biological stresses.

Many discharges to the Sound contain toxic and hazardous materials. These range from potential carcinogens, such as polychlorinated biphenyls (PCBs), to heavy metals like copper, lead and arsenic. Relatively little is known about the ways in which exposure to specific chemicals or combinations of chemicals affect marine life. Recent studies, however, have revealed significant biological problems associated with toxic contaminants at a number of locations in Puget Sound.

In one recent study, funded by EPA and the Washington Department of Ecology, alarming rates of abnormalities were found in bottomfish and benthic communities in marine waters adjacent to Commencement Bay. English sole in certain parts of the Bay were found to suffer liver neoplasms at a 5-8 percent rate and pre-neoplastic nodules at a rate of 18-26 percent. By comparison, Carr Inlet reference area rates were zero for both conditions. In addition, abnormalities were observed in communities of bottom-dwelling organisms (e.g. worms and clams). These communities tended to be dominated by a few species, rather than having the normal variety observed at Carr Inlet. Such "high dominance" communities generally indicate areas of environmental stress where less tolerant species are eliminated and more tolerant, opportunistic species achieve higher abundance.

Organisms exposed to contamination in the Sound are concentrating chemicals in their tissues and organs. Certain predators (e.g. harbor seals, blue herons) are known to accumulate PCBs and mercury in their body tissue as a result of eating contaminated, lower-trophic organisms such as fish and shellfish. Potential human health risk associated with the consumption of Puget Sound seafood is of concern. The flesh of English sole analyzed during the recent Commencement Bay study was tainted with toxic and carcinogenic substances. It also was estimated that an average of 1.5 people consuming a pound of fish daily from Commencement Bay face a one in a million risk of contracting cancer during a 70-year lifetime. Based upon the results of a cancer risk assessment analysis of Commencement Bay, warnings against eating seafood caught there were placed in portions of the Bay.

Current or past urban/industrial activities have been linked to toxic contamination in at lease five other bays. These are Elliott Bay (including Lake Union to Shilshole Bay), Everett Harbor-Port Gardner, Sinclair Inlet, Bellingham Bay and Eagle Harbor (see Figure 5). There are reasons to believe other embayments may have similar problems.

Another important public concern is the protection of the Sound's rich shellfish resource. The Puget Sound area constitutes about 20 percent of the shellfish resource in Region 10. Approximately 79,000 acres in Puget Sound and the Strait of Juan de Fuca are now classified for commercial shellfish harvesting. Of the total acreage, 41 percent is closed, 49 percent is open, and 10 percent is conditionally approved for commercial harvest. In the past thirty years, most of the densely populated eastern shore of the Sound from Tacoma north to Everett has been closed to commercial shellfish harvesting. To the south, where most of the remaining commercial shellfish operations are located, bacterial contamination from nonpoint sources appear to pose an increasing threat.

Bacteria are a food source for shellfish and are generally harmless. Fecal bacteria, however, serve as an indicator of the potential presence in water of harmful viruses and other pathogens associated with human and animal waste. The Washington Department of Social and Health Services certifies areas as safe for commercial shellfish production, and may close those areas where allowable levels of fecal coliform bacteria are exceeded.

In urban areas such as Elliot and Commencement Bays, shellfish are exposed to potentially harmful pathogens that enter the Sound from large sewage treatment plants, combined sewer overflows and urban runoff. Shellfish beds in such waters carry a high probability of bacterial and chemical contamination.

Although removed from urban centers, areas such as Hood Canal and Discovery Bay in southern Puget Sound may face decertification because of wastes resulting from growth of shoreline recreational developments, industrial operations and small-scale farming. Last year, 233 acres were closed in Quilcene Bay.

While the problems associated with toxic contamination in urban bays are of immediate concern, there is also growing concern about the cumulative impacts of chronic pollution exposure on the long-term health of the Sound. This concern is based on the recognition that large portions of Puget Sound are poorly flushed and data indicate that most of the contaminants entering the system remain in the system. While the Sound can absorb a certain amount of chemical and biological wastes, its assimilative capacity is limited. Recent studies by the National Oceanic and Atmospheric Administration (NOAA) have shown elevated levels of chemicals in the sediments of Puget Sound embayments far removed from any urban development or industrial activity.

Until recently, pollution control and prevention actions focused upon traditional approaches -- limiting municipal and industrial discharges through permits and by building wastewater treatment facilities, correcting sewer overflows, and developing management practices to control urban runoff. These methods significantly improved water quality. However an integrated, system-wide approach to current concerns and anticipated environmental problems is still lacking.

Public concern over the condition of Puget Sound moved the Washington State Legislature to establish the Puget Sound Water Quality Authority (reconstituted June 1985). It is the Authority's responsibility to develop a comprehensive plan that will restore and protect water quality (including long and short-term management goals), identify research needs and priorities, and recommend guidelines, standards and timetables for State and local activities. The Authority has been given two years and a substantial budget

to produce this plan.

Additional indication of support for the study and cleanup of Puget Sound is reflected by the continued funding of the Puget Sound Initiative. The Initiative joins federal, state and local agencies having regulatory, research and resource management responsibilities in Puget Sound to develop coordinated strategies to address marine environmental problems. In 1985, EPA contributed $1.6 million to this effort.

Regional Agenda/Barriers

As a first step in reducing toxic contamination in Puget Sound, EPA is funding the development of "action plans" for several urban bays where problems appear most severe. The action plans will define the problems, identify what needs to be done, when and by whom, and will call for sequential implementation. Implementation is expected to rely chiefly on enhanced waste treatment and cleanup by responsible parties (e.g., reduction of contaminant discharges, cleanup of in-place toxic hot spots). This strategy will be carried out through appropriate regulatory and enforcement actions if necessary. The EPA and WDOE are prepared to use the full range of their permit authority and enforcement capabilities to reduce future and current pollution.

In 1985, efforts to address toxic contamination in the bays of Puget Sound focused on Commencement Bay, Elliott Bay and Everett Harbor. Action plans are being developed for these areas and additional enforcement staff has been hired to assist with source identification, source control implementation and compliance.

Region 10 is also working with the U.S. Army Corps of Engineers and EPA Headquarters to develop criteria for environmentally safe levels of contaminants in marine sediments. It is anticipated that these criteria will be based upon studies of chemical/biological effects relationships. Sediment criteria will be used to supplement existing water quality criteria in judging the significance of contaminant concentrations and providing a basis for remedial actions.

In an effort to more fully quantify the loading of pollutants to the Sound and to reduce loadings to acceptable levels, EPA and the State of Washington are developing new strategies relying on clean water permits issued under the National Pollutant Discharge Elimination System. WDOE administers the program and monitors compliance. EPA provides assistance. Current work in this area includes:

* Review of discharges not covered by existing permits for possible permit issuance, inspection, and sampling and monitoring requirements.

* A cooperative effort with the Department of Social and Health Services to implement ways to reduce the impact of sewage treatment plants on nearby shellfish resources.

* Investigation by EPA to determine the feasibility of revising monitoring requirements to cover chemical contaminants of greatest concern.

* Completion by EPA of draft packages for state permits for eight municipal sewage treatment facilities which earlier were denied 301(h) waivers.

* Approval by EPA of municipal pretreatment programs for large cities like Seattle, Tacoma and Olympia. Implementation is required in the case of reissued permits.

In addition, Region 10 is collaborating with NOAA on field studies in Elliott Bay and Commencement Bay to determine the extent of transport of pollutants to the central basin of the Sound. Similar studies are underway to quantify the total loading of pollutants in the Sound by source, type and amount. Such studies will help us predict adverse effects associated with cumulative impacts of pollution. After enough technical information has been collected, EPA will develop a system-wide model to relate source inputs to depositional areas. The model will help evaluate the nature and extent of existing problems, develop an integrated abatement and protection program, and forecast future water quality impacts.

WDOE has the lead in efforts to prevent problems where shellfish harvesting is allowed and to restore water quality in decertified areas considered potentially certifiable. The State strategy involves:

1) Basin planning which will address nonpoint pollution from failing on-site sewage disposal, animal keeping, stormwater and clearing and grading.

2) Intensive surveys which will be designed to identify the general location and type of coliform sources. The surveys will typically involve bi-monthly sampling for up to a year at a time at a number of locations in the Sound.

3) Point Discharge Policies will address problems with new, existing, private, and municipal sewage treatment plants. This component features a cooperative effort with the Department of Social and Health Services to identify ways to reduce the impacts of sewage plants on shellfish resources.

In order to allow the most effective use of limited resources, WDOE has prioritized the various shellfish growing areas in the Sound using a classification system based on the degree of threat, and to a lesser extent, productivity. Intensive surveys require considerable staff and budget resources and will be conducted only in the highest priority areas. All shellfish culture areas are considered important, however, and the policies of intensive permit review and basin planning apply equally to all.

In Puget Sound, four areas have exceptionally high production and have been designated "unique" growing areas that will receive priority attention and protection: Burley Lagoon/Minter Bay, Hammersley Inlet/Oakland Bay, Totten/Skookum Inlet and Penn Cove (see Figure 6).. In 1985 and 1986, shellfish protection efforts will be concentrated in Burley Lagoon/Minter Bay and Skookum and Totten Inlets. Additional work to examine options for controlling discharges of bacterial contaminants from nonpoint sources will be initiated for the Stillaguamish Basin. Dairy waste management plans will be developed for King, Pierce and Skagit Counties.

Historically, efforts by WDOE and the Department of Social and Health Services to protect Puget Sound shellfish resources have focused on bacterial contamination. Very little work has been done to date to examine toxic chemical contamination of shellfish. As a first step in addressing this issue, EPA will be funding studies in 1986 to study chemical uptake and accumulation in shellfish and the associated health risk to humans who might consume contaminated shellfish.

Headquarters Actions Needed

Additional staff for contract management and oversight activities.

More decision-making authority at the policy level should be delegated to the Regional Administrator.

Environmental Results

Through pretreatment and other Clean Water Act controls, reduce discharges of toxic and hazardous wastes to Puget Sound.

Reduced incidence of fish and shellfish abnormalities in Puget Sound embayments.

Reduced number of commercial shellfish acres closed due to bacterial contamination.

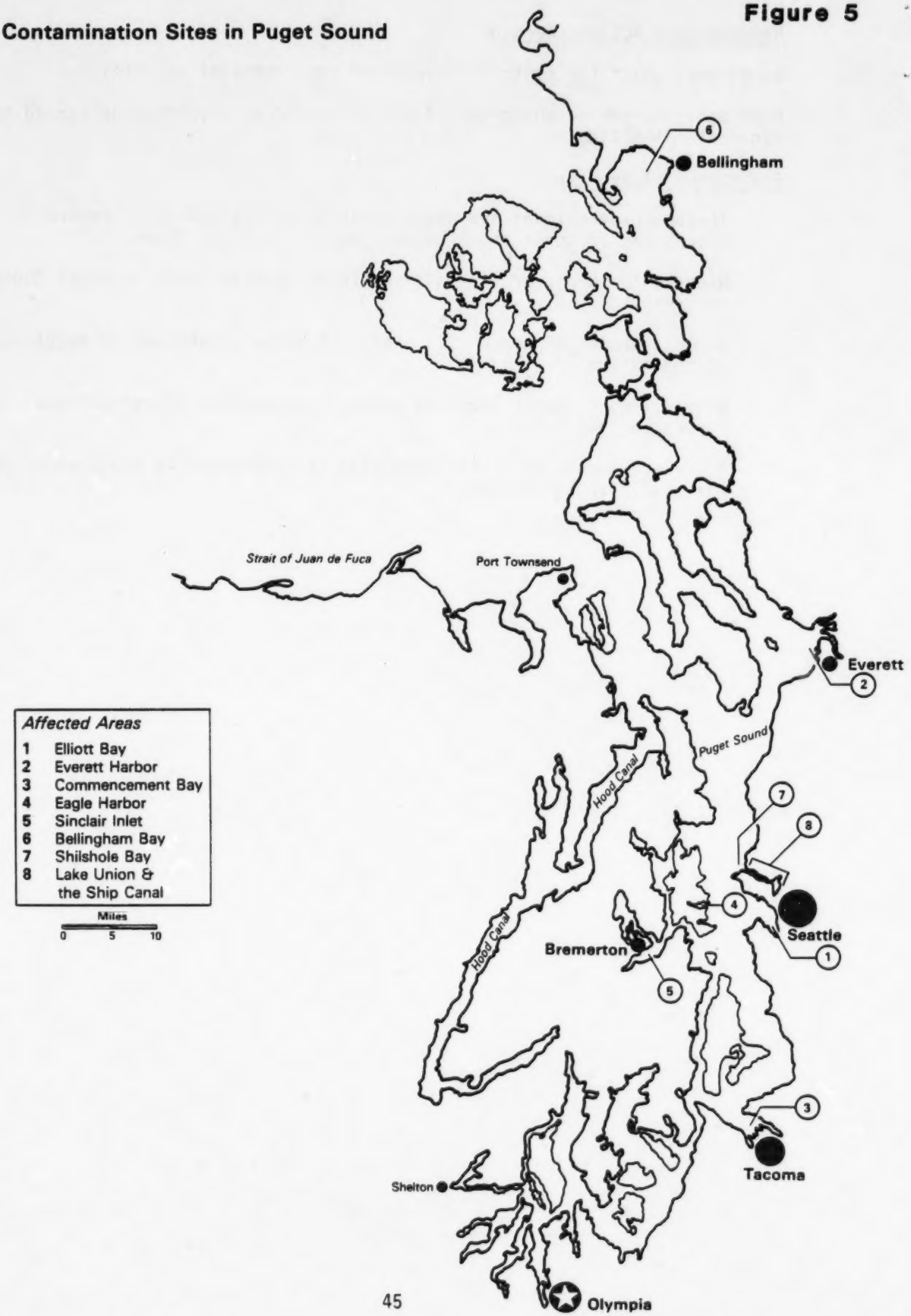
Revocation of health warnings against consumption of recreationally harvested shellfish.

Increased number of acres classified as conditionally approved or open for shellfish harvesting.

Figure 5

Chemical Contamination Sites in Puget Sound

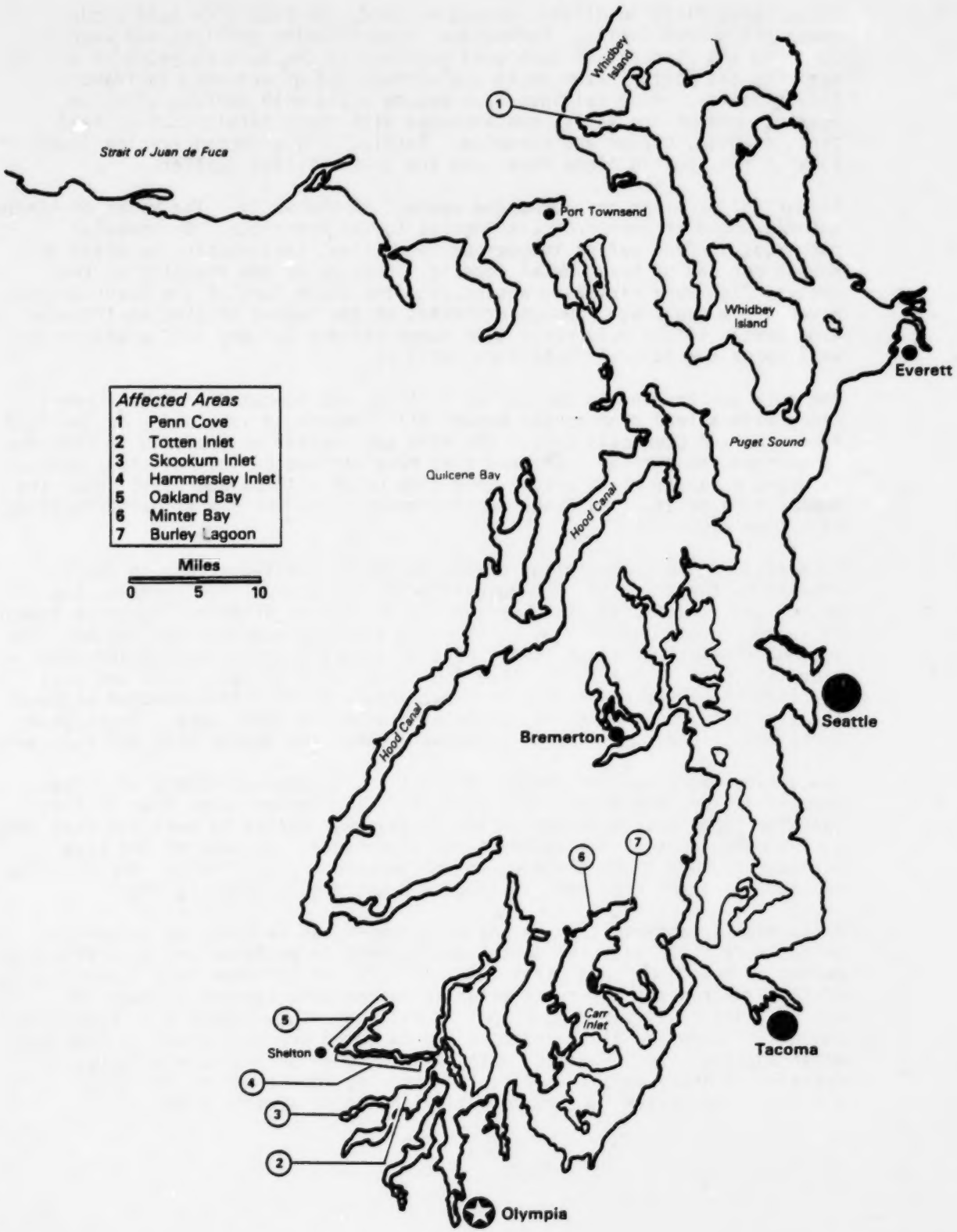
June 1983



Puget Sound Priority Shellfish Protection Areas

Figure 6

June 1983



SILVER VALLEY/COEUR d'ALENE, IDAHO

Problem Assessment

Idaho ranks first in silver, second in zinc, and fourth in lead production among the United States. Extraction, concentration (milling and washing), smelting and disposal of such ores over nearly one hundred years of mining activity has contaminated soils and surface and groundwater in Idaho's Silver Valley. Mine tailings have become mixed with surface alluvium, leaving much of the Valley contaminated with heavy metals such as lead, zinc, cadmium, copper and chromium. Particularly affected are the South Fork of the Couer d'Alene River and the Silver Valley aquifer.

Silver Valley mines are among the deepest in the world. The miles of mining tunnels would stretch from Los Angeles to San Francisco. Groundwater recharges surface waters throughout the Valley, contributing hundreds of pounds per day of heavy metal loading. Because of the toxicity of the metals, fish were virtually absent from the South Fork of the Coeur d'Alene River a few years ago. Rough estimates of the amount of zinc contributed by groundwater to the main river stem range between 800 and 1000 pounds a day - well above the natural level (see Table 5).

The only smelter in the Valley, at Kellogg, was operated in recent years along with a lead mine as the Bunker Hill Company, a subsidiary of the Gulf Resources and Chemicals Corp. The mine and smelter were closed in 1981 due to economic conditions. EPA and IDHW have defined an initial study area of twenty-one square miles around this site which will be addressed under the Superfund program. The Bunker Hill complex is on EPA's National Priorities List (see Figure 7).

Knowledge of the geohydrology of the Valley is limited except in areas studied by the EPA, U.S. Geological Survey and Idaho. For example, the bottom and surrounding dikes of the 160 acre waste disposal lagoon at Bunker Hill leak through underlying soils. Two aquifers underlie the lagoon. The top one consists of about twenty feet of sand and gravel intermixed with mine tailings. A thirty to fifty foot layer of fine sand, silt and clay overlays the lower aquifer. The zones appear to be interconnected although the greatest impact is mainly associated with the upper zone. Tests show unhealthful levels of zinc in groundwater near the Bunker Hill tailings pond.

The ground-water aquifer beneath the Valley is composed mainly of stream deposited sands and gravels and glacial fill. Depths range from 30 feet near the upper (eastern) end of the Valley near Mullen to over 400 feet deep at the other edge of the Valley fifty miles west. Because of the high permeability and short distance to the uppermost ground water, the potential for contamination from mine tailings and waste discharges is high.

Heavy metals contamination in the environment can be toxic to humans and animal life. For example, mental development in children can be retarded by eating or breathing lead particles. In 1978, an airborne lead concentration of 18.99 micrograms per cubic meter (compared with current standard of 1.5) was recorded at Silver King School in Kellogg. (See Figure 8). Excessive amounts of cadmium, zinc, antimony and chromium are also toxic to fish and other aquatic life. However, with the slow down of mining activities, a decrease in heavy metals loading is improving conditions in the Coeur d'Alene river system for the re-establishment of aquatic life.

Ten mines in the Valley are still active according to NPDES permit records (see Figure 9). The local Bunker Limited Partnership has purchased that facility and reopened the Crescent (Silver) mine. (Bunker LTD is currently salvaging the smelter's rolling stock).

Regional Agenda/Barriers

Environmental problems in the Silver Valley are being attacked under several Federal laws, the Clean Air Act, the Clean Water Act, the Comprehensive Environmental Response, Compensation and Liability Act (Superfund) and the Safe Drinking Water Act. Taking these in order:

The Clean Air Act:

Since the shutdown of the Bunker Hill smelter and the completion of an on-site cleanup, there have been no measured violations of the health-related standard for lead in the air of the Valley, although localized violations may occur where the soil is highly contaminated. (See Table 7).

Under the settlement of a Clean Air Act lawsuit by the Natural Resources Defense Council, EPA regulations will require the smelter, if it is reopened, to begin in 1988 to use controls like those at comparable U.S. smelters. Such controls would significantly reduce quarterly ambient concentrations of lead in the valley, as compared with pre-shutdown levels. For example, quarterly average ambient concentrations of lead at the Silver King School in Kellogg would be reduced below 3 micrograms per cubic meter of air in 1988, compared with the quarterly average level of 18.99 measured at the school in 1978. Additional controls would be required in 1990 to attain the health-related standard for air purity throughout Silver Valley.

The Clean Water Act:

Water in the South Fork of the Coeur d'Alene River has improved in recent years. Since 1976, concentrations of heavy metals have decreased significantly and a concurrent improvement in the fishery has been observed. (See Table 6). Waste water discharge permits requiring nationally standardized, technology-based levels of control may not achieve stream and ground-water quality goals in the Valley.

Three major mining and milling operations need new Federal permits. These operations are being examined to see if additional controls are needed. As appropriate, biomonitoring may be required at these facilities to test the toxicity of their effluent, and controls will be required on surface runoff and seepage from tailings ponds.

Region 10 and the Idaho Department of Health and Welfare are exploring a cooperative, one year ambient water monitoring study along the South Fork Coeur d'Alene River and its tributaries. The study would help locate and characterize sources of heavy metal loadings and so help develop site specific criteria for discharge permits. If approved, the study should begin in spring or summer of 1986.

Superfund:

EPA Region 10 has lead responsibility for the Superfund remedial investigation and cleanup feasibility studies at the Bunker Hill smelter site. The Idaho Department of Health and Welfare provides technical advice

and studies and ensures that the 6000 or so affected residents in the area are included in decision-making processes. An advisory task force was created by the Shoshone County Commission to work with EPA and the Idaho Department of Health and Welfare on the cleanup. Due to the size and nature of the site, community support is essential. A community relations plan has been developed for the project.

The principal barrier to immediate action under Superfund is the lack of an adequately specific definition of problems at the site. Existing data from state, local and federal agencies, past and present owners of the mine and smelter and university researchers is being reviewed for an interim report due by late summer, 1985. By year end, we will identify any further studies needed to plan Superfund cleanup activities.

In the interim, EPA and the State are evaluating short-term measures that could be taken on site to reduce public exposure to heavy metals from contaminated soils that collected in children's play areas and other areas that are current sources of windblown dust. This evaluation, too, is to be completed by winter 1985. The State Department of Health and Welfare also is seeking Federal aid for a 3-year program to keep lead levels in the blood of children as low as possible during the long-term cleanup. The remedial investigation work plan should be completed early in 1986 and take one year to execute. Gulf Resources, the former owner of the smelter, has expressed interest in carrying out the remedial investigation and cleanup feasibility study.

Safe Drinking Water Act:

Lack of data and uncertainty about Agency policy still bars action on groundwater problems in the Silver Valley. EPA is working on a policy to guide decisions on the degree of cleanup to be undertaken at various types of aquifers. Superfund-related studies at Bunker Hill are expected to provide additional information; however, no ground-water- specific remedial activities have taken place and no other well sampling for heavy metals has been conducted.

The Bunker Hill waste disposal is being evaluated, and the dried-up tailings pond at the inactive Page mine near Smelterville may also be considered for Superfund cleanup. Work also is needed to characterize the aquifer system according to hydrology, gradients, and connections between ground and surface waters.

Headquarters Actions Needed

Develop the national ground-water classification policy so goals may be set regarding the extent of aquifer cleanup work required.

Augment laboratory analytical capabilities needed to define the extent of present contamination and to plan future prevention and mitigation strategies.

Environmental Results

Environmental monitoring at the completion of the Region 10 work would reveal lower levels of heavy metals contamination in soils, surface waters, and groundwater. The local fishery should continue to improve as stream water quality also improves.

TABLE 5

ESTIMATED AVERAGE LOADINGS IN THE SOUTH FORK COUER D'ALENE RIVER BASIN
LOW FLOW CONDITIONS

Total Zinc

Survey Date	River Flow Near Kellogg cfs cfs	All sources Above BH to Mile 6.9		Leakage/ Seepage from CIA Area Mile 6.9 - 5.3		Bunker Creek & CIA Discharge Mile 5.3		Silver King Creek Dschrge Mile 5.0		Seepage & Inflows from Mile 5.3 - 2.3		TOTAL BASIN LOADING
		LBS/DAY	%	LBS/DAY	%	LBS/DAY	%	LBS/DAY	%	LBS/DAY	%	LBS/DAY
Oct. 9, 1974	79	1200	24%	1450	29%	160	3%	1900	38%	300	6%	5000
Oct. 7-9, 1975	122	1620	28%	1950	34%	400	7%	1330	23%	450	8%	5750
Oct 5, 1976	79	1300	14%	3950	42%	1200	13%	1850	20%	1000	11%	9300
Sept. 18-19, 1979	66	760	30%	1000	40%	40	2%	10	--	700	28%	2500
Oct. 7-8, 1980	76	1070	42%	1070	42%	70	3%	10	--	330	13%	2550
Sept. 21-21, 1982	89	1000	48%	650	31%	40	2%	40	2%	350	17%	2100
Sept. 26, 1984	95	1100	55%	550	27%	100	5%	20	1%	250	12%	2000

NOTE: * Broken Waste line from zinc plant to waste disposal site complex caused abnormally high loadings during this survey.

Source: EPA Water Quality Survey Data

TABLE 6

Comparison of Metal Concentrations - 1982 and 1984
South Fork and Main Stem Coeur d'Alene Rivers

Main Stem - Coeur d'Alene River[1]

	Flow (cfs)	Total Cadmium (mg/l)	Total Copper (mg/l)	Total Lead (mg/l)	Total Mercury (mg/l)	Total Zinc (mg/l)
September 1982	261.0	0.1	0.7	18.0	0.1	1.0
September 1984	311.0	0.2	2.0	0.5	0.1	1.0

South Fork Coeur d'Alene River[2]

September 1982	141.0	16.7	2.15	31.0	0.1	2767.0
September 1984	145.5	23.2	15.0*	25.4	0.1	2563.0

*(range 2.0 to 39.3)

1 Not affected by mining.
Above confluence with the South Fork Coeur d'Alene River.

2 Affected by mining.
Above confluence with the Main Stem of the Coeur d'Alene River.

Source: EPA Water Quality Survey Data.

TABLE 7

Silver Valley Ambient Lead Concentrations

Quarterly Averages (ug/m3) - 1975 to 1984

Monitoring Site	Year	Quarterly Average 1	2	3	4
KELLOGG MEDICAL CENTER	1975	7.06	5.31	5.97	11.22
	1976	7.11	4.24	9.37	8.37
	1977	9.63	6.55	4.21	6.71
	1978	5.94	2.37	4.16	9.20
	1979	8.25	4.92	4.82	5.37
	1980	6.82	3.32	4.55	8.72
	1981	6.67	2.41	2.21	5.04
	1982	.36	.38	.02	.16
	1983	.24	.22	.12	.18
	1984	.16	.12	.09	.12
KELLOGG SILVER KING SCHOOL	1975	15.50	12.36	17.05	18.78
	1976	12.66	11.52	18.49	16.73
	1977	14.87	15.75	12.14	13.04
	1978	10.62	6.23	7.03	18.99
	1979	13.54	8.02	11.08	10.37
	1980	13.33	4.67	9.21	13.67
	1981	11.62	3.66	6.51	7.88
	1982	1.75	1.01	.51	.20
	1983	.27	.26	.13	.13
	1984	.17	.10	.15	.07
OSBURN RADIO STATION	1975	3.12	.88	1.12	2.31
	1976	1.62	.77	1.54	2.34
	1977	4.69	1.31	1.16	2.81
	1978	1.72	.67	.87	2.58
	1979	4.11	.86	.89	1.35
	1980	2.10	.74	.77	2.15
	1981	1.49	.75	.09	.43
	1982	.14	.06	.06	.12
	1983	.18	.14	.09	.17
	1984	.13	.06	.07	.13
PINEHURST SCHOOL	1975	3.28	1.79	3.93	3.23
	1976	3.31	1.34	3.31	5.04
	1977	4.85	2.91	2.25	4.21
	1978	3.01	1.02	1.55	5.08
	1979	4.57	1.69	3.06	2.91
	1980	2.42	.94	2.15	3.33
	1981	1.54	.69	.88	1.54
	1982	.29	.07	.09	.17
	1983	.22	.16	.08	.16
	1984	.12	.06	.08	.09

Source: 1984 Idaho Air Quality Annual Report

Figure 7

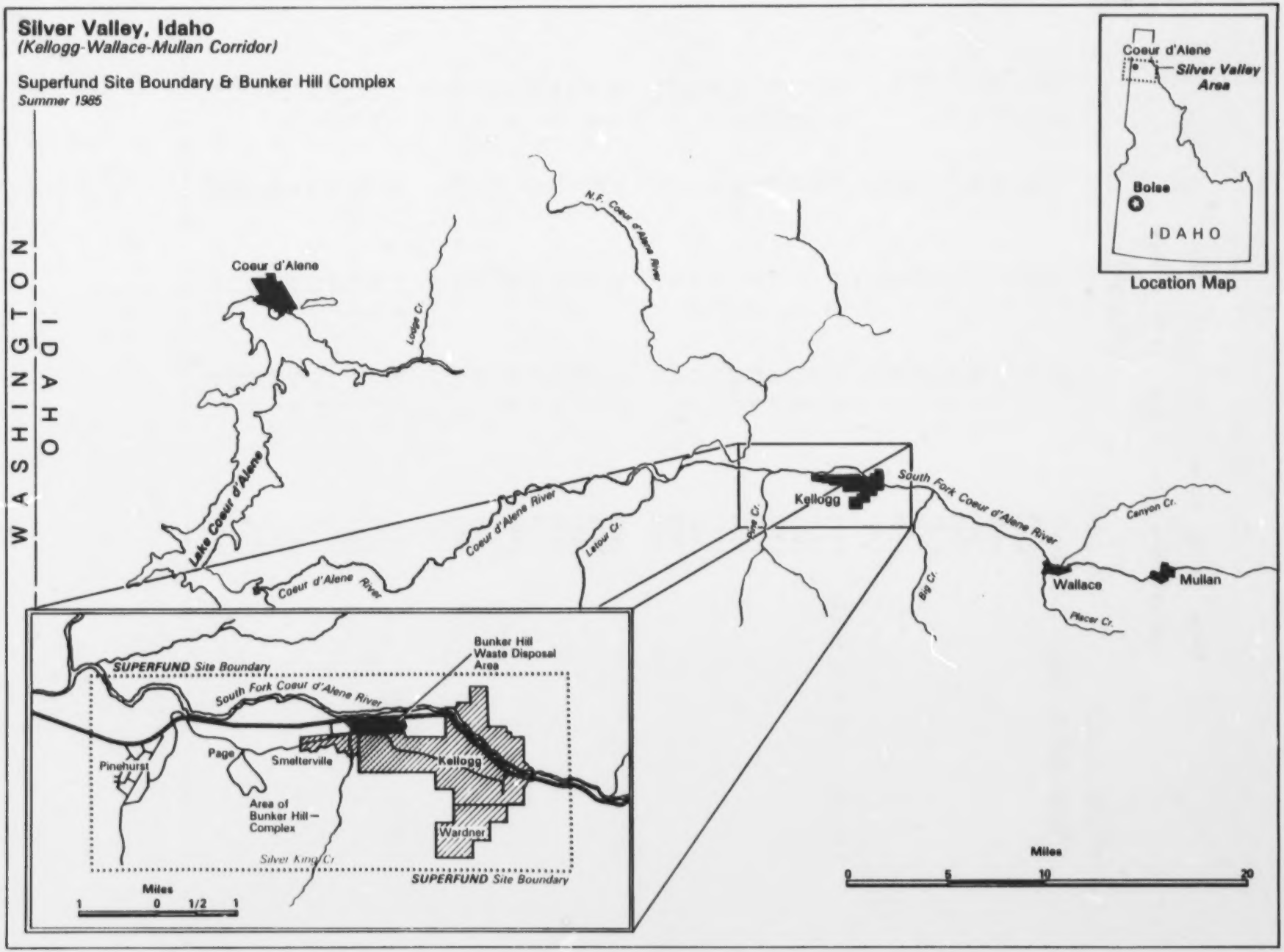
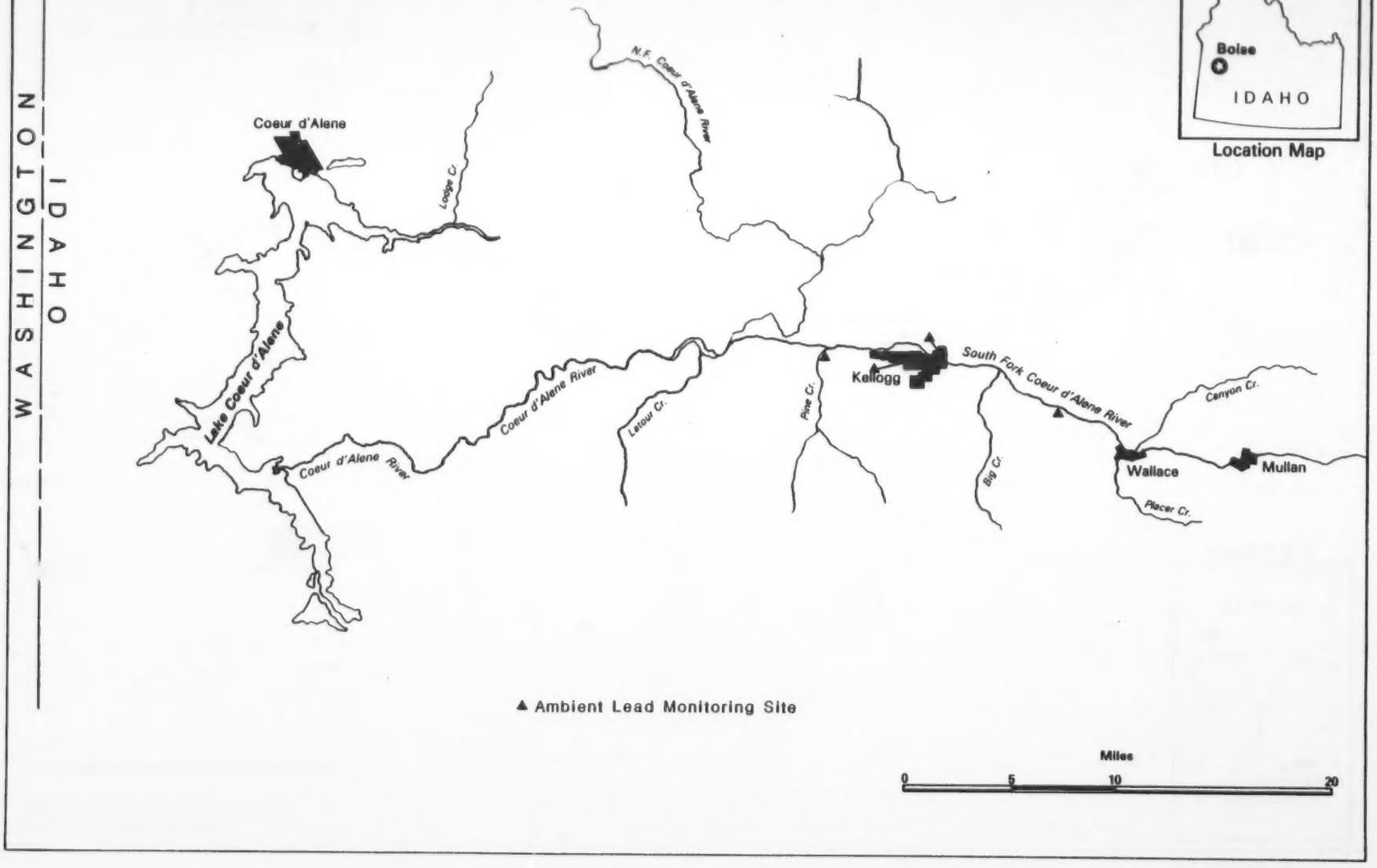
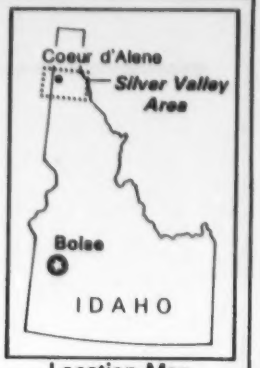

Silver Valley, Idaho
(Kellogg-Wallace-Mullan Corridor)
Superfund Site Boundary & Bunker Hill Complex
Summer 1985
WASHINGTON
IDAHO
Coeur d'Alene
Silver Valley Area
Boise
IDAHO
Location Map
N.F. Coeur d'Alene River
Coeur d'Alene
Lake Coeur d'Alene
Coeur d'Alene River
Latour Cr.
Kellogg
South Fork Coeur d'Alene River
Canyon Cr.
Wallace
Mullan
Placer Cr.
Big Cr.
SUPERFUND Site Boundary
Bunker Hill Waste Disposal Area
South Fork Coeur d'Alene River
Pinehurst
Page
Smelterville
Kellogg
Area of Bunker Hill Complex
Wardner
Silver King Cr.
SUPERFUND Site Boundary
Miles
1 0 1/2 1
Miles
0 5 10 20

Figure 8

Silver Valley, Idaho
(Kellogg-Wallace-Mullan Corridor)

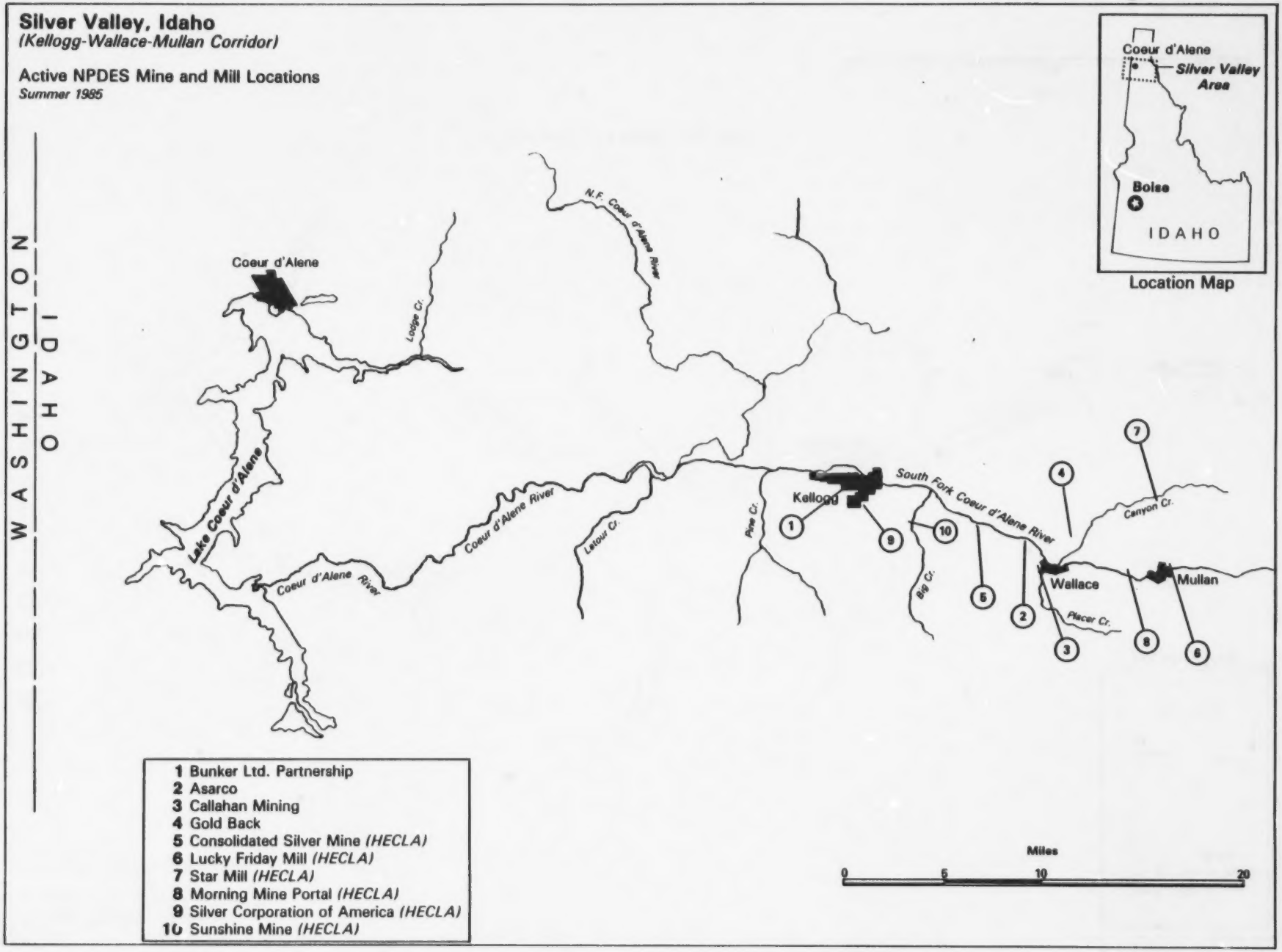
Ambient Lead Monitoring Sites
Summer 1985





Location Map

Figure 9


Silver Valley, Idaho
(Kellogg-Wallace-Mullan Corridor)
Active NPDES Mine and Mill Locations
Summer 1985
WASHINGTON
IDAHO
Coeur d'Alene
Silver Valley Area
Boise
IDAHO
Location Map
Coeur d'Alene
Lake Coeur d'Alene
Lodge Cr.
N.F. Coeur d'Alene River
Coeur d'Alene River
Latour Cr.
Pine Cr.
Kellogg
South Fork Coeur d'Alene River
Canyon Cr.
Big Cr.
Wallace
Placer Cr.
Mullan
1 Bunker Ltd. Partnership
2 Asarco
3 Callahan Mining
4 Gold Back
5 Consolidated Silver Mine (HECLA)
6 Lucky Friday Mill (HECLA)
7 Star Mill (HECLA)
8 Morning Mine Portal (HECLA)
9 Silver Corporation of America (HECLA)
10 Sunshine Mine (HECLA)
Miles
0
5
10
20

Part III. Recommendations for the FY 87-88 Agency Priority List

Air Program

1. The ranking assigned to acid deposition is too high. Acid deposition should be placed after Priorities #9, #15, and #16.

2. Radon should be added as a national priority problem in the top 10 - 15 items on this list. Radon could be included in Priority #15, but if so, should be explicitly mentioned.

3. Priority #9 should also emphasize the need to implement air compliance assurance agreements. The need to increase permit and point source compliance should be be specifically mentioned.

4. Priority #15 should clearly refer to a national air toxics strategy as opposed to "...a comprehensive national strategy for the control of hazardous air pollutants."

5. Priority #15 should state the need to development and implement an air toxics emergency response capability.

Water Program

6. Priority #20 which deals with nonpoint source control should be given much higher priority.

RCRA Program

7. If State RCRA programs were authorized, the issuance of permits and reductions in the number of violations would be more readily accomplished. Priority #21, RCRA authorizations, should be moved up with Priorities #3 and #4.

Region 10

1985 Environmental Management Report Update

Significant Environmental Problems Chart

Relative Ranking of Environmental Problems	Geographic Scope	Level of Public Concern	Contaminants Of Concern	Major Source
Hazardous Waste Contamination of Groundwater	Region	Low	organic compounds toxic metals radioactive waste pesticides	generators transporters disposers
Puget Sound	Washington	Low	coliform bacteria organic toxicants heavy metals	failing septic tanks waste treatment plants various industries dredge/disposal activities
Air Toxics	Region	Medium	chlorinated solvents aromatic polycyclic hydrocarbons, asbestos	chemical industries wood treatment industries wood stoves, motor vehicles field burning
PCB Strategy for Utility and Scrap/Salvage Operations	Region	Medium	PBCs	electric capacitor manufacturers and salvage operations
Bacterial/Chemical Contamination of Shellfish	Alaska Oregon Washington	Medium	coliform bacteria organic toxicants PSP	failing septic tanks dairies/small-scale farms waste treatment plants
Pesticide Contamination of Groundwater	Region	Medium	EDB, 2,4-D and others	agriculture silviculture
LUST	Region	High	Toxic & hazardous chemicals	under investigation

1985 Environmental Management Report Update

Significant Environmental Problems Chart

Relative Ranking of Environmental Problems	Geographic Scope	Level of Public Concern	Contaminants of Concern	Major Source
Wetlands Protection	Alaska Oregon Washington	Medium	varies with location	dredge & fill activities agricultural drainage oil & gas development log transfer
Nonpoint Source Contamination of Surface Water	Region	Medium	bacteria, pesticides sediments, nutrients	agriculture silviculture urban runoff mining septic tank failures
Silver Valley, Idaho	Idaho	High	heavy metals	mining smeltering
Carbon Monoxide	Region	High	carbon monoxide	motorized vehicles wood Stoves
Acid Deposition	Region	Medium	sulfates nitrates	various industries motor vehicles
Respirable Particulates	Region	High	PM -10 particles	wood stoves field burning fugitive rural dust wood products processors
Placer Mining	Alaska	High	arsenic suspended solids	placer mining operations

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE

SEATTLE, WASHINGTON 98101

AUG 7 1985

DRAFT

REPLY TO ATTN OF: M/S 312

MEMORANDUM

SUBJECT: Environmental Indicators

FROM: Marci Melvin
EMR Coordinator, Region 10

TO: Pam Cooper
Environmental Results Branch

As requested, I am enclosing a summary of the environmental indicators that have been proposed by our EMR authors. They are listed below by environmental problem captions. We did not limit discussion of environmental indicators to our geographic specific problems. These indicators represent a mixture of short and long term measures --- many simply represent a "wish list" of information we would like to have were funds and resources not an issue.

Carbon Monoxide

1. Number of locations with healthful CO levels.
2. Number of local attainment goals met through I/M programs.
3. Number of nonattainment areas.
4. Number of violation days.
5. Number of secondary ambient violation days.

Respirable Particulates (PM -10)

1. Improved visibility levels through comparative measurement.
2. Reduced exposure to high concentrations of PM -10.
3. Reduced exposure to rural fugitive dust.
4. Number of locations meeting NAAQS for PM -10.

Air Toxics

1. Decreased air toxics emissions from traditional and non-traditional sources (woodstoves, landfills, sewage treatment plants, field burning, hazardous waste sites).
2. Reduced cancer risk associated with air toxics exposure.

Acid Deposition

1. Wet deposition trends.
2. Lake acidity levels.
3. Changes in tree growth patterns.
4. Reduced sulfate and nitrate emissions.
5. Fish population and algal growth trends.

Asbestos

1. Increased school compliance rates.

Nonpoint Source Pollution

1. Number of acres/lakes or miles/streams not meeting designated uses.
2. Number of stream miles not meeting normal temperatures.
3. Decreased loadings of sediment, nutrients, pesticides and bacteria in surface waters.

Placer Mining

1. Compliance rates for turbidity and arsenic standards.
2. Number of miles of increased water clarity and dissolved oxygen values in streams affected by placer mining activity.
3. Number of miles of decreased suspended and settleable solids loadings in streams affected by placer mining activity.
4. Number of stream miles supporting designated fish populations.
5. Increased percentage of fish egg survival in streams affected by placer mining.

LUST

1. Number of leaking tanks in Region 10.
2. Reduced instances of volatile organic chemical contamination of groundwater supplies.
3. Reduced potential for leaking tank contamination in Region 10.

Groundwater Contamination - RCRA/Superfund

1. Number of final RCRA permits issued.
2. Attainment of toxic concentration limits in groundwater at hazardous waste sites.
3. Number of national priority sites.
4. Reduced exposure levels at remedial action sites.

Groundwater Contamination - Pesticides

1. Reduced migratory pesticide levels in areas vulnerable to groundwater contamination.
2. Reduced pounds of pesticides applied in vulnerable groundwater areas.

PCBs

1. Number of inspections or civil complaints.
2. Number of private sector clean-up programs.
3. Number of scrap/salvage operations in compliance.

Shellfish

1. Acres of shellfish grounds re-opened for harvest.
2. Acres of priority shellfish grounds closed to harvest.
3. Reduced levels of toxic and bacterial contamination in shellfish waters and shellfish tissues.

Wetlands

1. Decrease in acres of wetlands lost.
2. Increase in acres of wetlands restored or protected.
3. Number of violations reported by public.
4. Number of Corps permits containing mitigation plans.
5. Number of referrals or enforcement actions that minimize impacts or replace functional values.
6. Number of state enforcement conferences held.

7. Number of cubic yards of dredged material not allowed for in-water disposal due to EPA sediment criteria.

Silver Valley - Coeur d'Alene, Idaho

1. Increased fish populations in streams contaminated with heavy metals.
2. Reduced levels of lead, zinc, cadmium, copper and chromium in surface water, soil and groundwater.
3. Reduced population exposure to contaminated soils.
4. Reduced blood lead levels in children.
5. Reduced contaminant loading to the South Fork Coeur d'Alene River from surface water and groundwater inflows within the Superfund area.

Puget Sound

1. Reduced cases of biological abnormalities in benthic fish populations.
2. Reduced levels of toxic contaminants in sediments and interstitial waters.
3. Removal of health warnings against fish and shellfish harvest.
4. Increased reproductive success of fish and shellfish.